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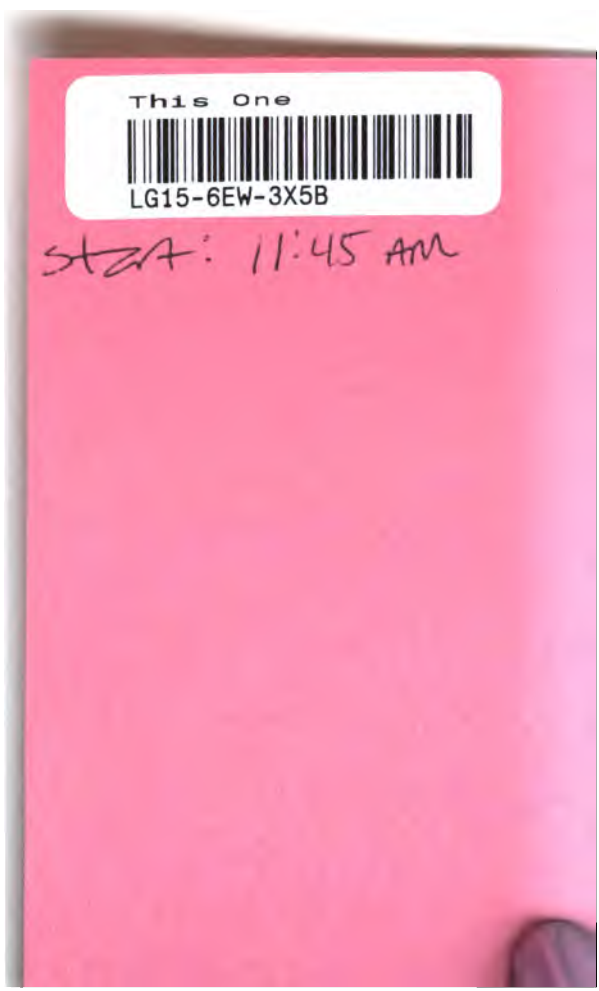
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LETTERS AND PAPERS

ON

AGRICULTURE, PLANTING, &c.

SELECTED FROM

THE CORRESPONDENCE

OF THE

BATH AND WEST OF ENGLAND SOCIETY,

FOR THE ENCOURAGEMENT OF

AGRICULTURE, ARTS, || MANUFACTURES, AND COMMERCE,

VOL. XIV.



PRINTED, FOR THE SOCIETY, BY

RICHARD CRUTTWELL, ST. JAMES'S-STREET, BATH;

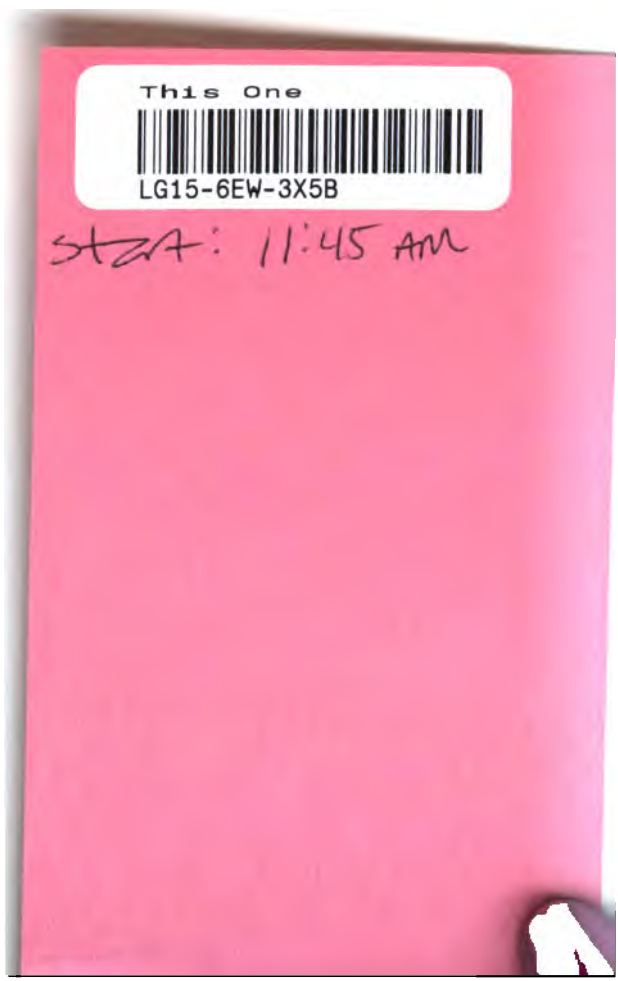
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actions was inscribed; and he has been followed by a succession of men, who would reflect credit and honour on any institution. Sensible as we are of the obligations conferred on the Society by each and all of those eminent persons, and mindful as we shall ever be of the favour bestowed, and the assistance afforded, by them, we hesitate not to declare it as our opinion, that to none, Sir, is the Society more indebted, than to you. During the many years that you have presided over us, repeated thanks, and reiterated applauses, have exhibited but a faint image of the general sentiment of approbation which your conduct has received, and to which it is justly entitled. We feel, however, that a more permanent testimony of the estimation in which your merits are held, is wanting; and in dedicating to you this Fourteenth Volume of the Transactions of the Society, and in conveying to the public, under the form of an address to you, such introductory remarks as have generally formed the Prefaces of our successive publications, we are confident, that this departure from general usage will be only considered as a feeble tribute of the high sense which the Society entertains of the value of your occasional contributions* to our volumes; of that ability with which you have ever fulfilled the

* On the subject of Inclosing Commons.

duties of the chair; of that care and attention which you have ever bestowed on its interests; and, more than all, of that zealous attachment with which you have taken part in its success; and in a manner identified, with your own, its character and reputation.

The present volume commences with the Annual Reports of the years 1814 and 1815, including, Sir, your Addresses to the Society at each Anniversary. There can be no doubt, that, to these faithful records of the Transactions of the Society, your luminous and instructive speeches will give a strong additional interest.

The very ingenious and scientific Essay, (which makes a part of these transactions,) on the Diseases of Wheat, was written in accordance with the wishes of the Society, that so important a subject should be well investigated, and in claim of one of its premiums. To the honour of the author, the Rev. R. HOBLYN, and to the gratification of the Society, it obtained the premium. Although the Reverend and learned Author seems to think, that there is no cure for these diseases, after they have shewn themselves in the plant, much and valuable information is to be gained by his accurate account of the cause, history, and progress, of the distempers to which wheat is subject.

To these succeeds an Essay on the Commutation of Tithes. Here a few words may be necessary, as the views and objects of the Society in offering premiums for the best Essay on this subject have been, by some, misunderstood. It seems extraordinary, that the system of tithes should be so commonly considered as affecting the Clergy only; whereas, in point of fact, a considerable number of persons of all ranks in the state, and of all the various professions of christian belief throughout the kingdom, are materially interested in the same question. But whether tithes be in the hands of clergymen or laymen, the revenues arising from them are as sacredly protected by law and right, as those of any body corporate, or of any individual, in the realm. This position it would be folly to doubt; and in this Society at least, it has never, for a moment, been made a matter of question. Were any proof necessary on this point, we might refer to the words of the premium itself;* and as far as you, Sir, as the head and organ of the Society, are concerned, nothing can more strongly mark your opinions, than the emphatic words made use of in your Speech

* "The writers on this subject will be expected to point out the "best mode, either gradual or immediate, to be adopted for pro- "ducing the extinction of Tithes; whereby the present proprietors, "whether clergy or laity, may receive a fair compensation."

to the Society, at the Annual Meeting 1814.† That the mode of collecting this tax, or, perhaps, to speak more correctly, of raising this revenue, is attended with moral and political evil, seems to be acknowledged on all hands; and the Society had no other object, than to call forth the suggestions of those, who had considered the subject, with respect to such remedies as, without infringing or diminishing, either at the present or any future period, any existing right, might obviate the evils which have commonly been supposed to attach to the *modus operandi* of this burthen on the cultivator of the soil. That the views of the Society have not been generally mistaken, is proved by all of the many Essays which have been sent in claim of the premium; and it is a fact, worthy of observation, that of the four communications now and heretofore published in its volumes, two have been written by Clergymen of the Establishment. As to the mode of commutation recommended in either case, the Society is not at all accountable; it is always sufficient to obtain a premium, that an Essay is the best, in the opinion of the majority of the Committee, of

† "Still, however, no change ought to be made, until a secure, "honourable, and full equivalent, can be found; and no plan "should have his sanction, which did not effectually protect, and "adequately provide for, the just rights of the Clergy."

those Essays or Compositions, which are brought into competition. You know, Sir, that the Society has always desired it to be understood, that it is not responsible, as a Society, for details of facts, or for opinions. Some copies of the Prize Essay on Tithes, contained in this volume, have been already printed; but the premium having been adjudged in its favour, it is, according to custom, entitled to republication, and a place in this volume. Another Essay, and also a Letter, on the same subject, will be found among the subsequent pages; the former is the production of the Rev. C. LEWIS, by whose permission it is printed; the latter is addressed to the Committee by THOMAS EDWARDS, LL. D.

The Society has continued to offer its premiums "for the cultivation of Fiorin Grass," and they have been successfully claimed in three instances. The first was gained by WM. DICKINSON, esq; M.P. and is mentioned in the preface to volume 13. The second by Sir J. C. HIPPISLEY, bart. M. P. the report of whose experiment appears in the present volume. Both these experiments were made on lands cultivated with stolones imported from Dr. RICHARDSON's farm in Ireland. With a view to make a comparison of the species or variety, a premium was offered for the cultivation of Fiorin from the indi-

genous plant growing in England. This *third* experiment was made by the Rev. W. B. BARTER, whose report on the result obtained the premium, and is here recorded. Thus three Vice-Presidents of the Society have put to the test of experiment the properties of the vegetable. Let the public form its own judgment. Whatever may eventually prove to be the just value of Fiorin, be it great, or be it small, the Society, even on the most unfavourable issue, will have no reason to regret that it offered its premiums, and gave reward for trials by its adjudications. Its object is to elicit truth; and whether results be propitious, or the contrary, benefit is obtained for the community, who are taught either to adopt a good, or, without much individual loss, to avoid a bad, practice.

From America we have been favoured by the Hon. RICH. PETERS, with a variety of green sands, accompanied with letters testifying the advantages agriculturists in the United States have experienced, from their being employed as manures on different soils: these have been submitted to Dr. WILKINSON, our chemical professor's, examination. From the results of his analysis he finds them nearly to correspond with the green sand of Wiltshire. In the neighbourhood of Warminster, the intermixture of this sand with manure has been beneficially employed. We are

not informed of any experiments having been made in this country, relative to this green sand being used alone; we hope that the observation of the American Agriculturists will excite in our farmers, whose lands may be situated in the vicinity of these sands, some attention to their properties as a manure.

The communications on "the Cure of the "Quarter Evil," on "the Marine Pea," and on "Burning of Clay," and Mrs. Ibbetson's paper "on suiting Plants to the Soil, &c." will be found valuable to most readers; and may serve as hints to honorary and corresponding members, not to be sparing of their communications, as they will ever receive from the Society its thanks, and the notice due to their merits.

According to the usual proceeding of the Society, their "Report of the late Ploughing "Match" is here given; by which it will be seen that, at every trial for the premiums, competition increases, and that much good (if it be only by teaching modes of abridging labour) is produced in every district where the meetings are held.

The Society having been recently favoured with a letter from the pen of an esteemed and learned Vice-President, on the subject of the "Poor Laws," which impose so great a burthen on agriculture; it is supposed, that the Author's judicious and correct observations will afford

gratification to the Members, and also to readers in general.

It is painful to record the death of any valued member of this Society. The particular loss now alluded to will be regretted by every member of the body. Since the last annual meeting, Mr. W. MATTHEWS (one of the few survivors of the early subscribers, and who was for thirteen years the enlightened and efficient Secretary of the Society, which office he filled with distinguished and well-merited applause) has been removed from this his scene of activity and usefulness. He continued until his death a highly useful member of this Institution, and contributed materially to raise it to that degree of eminence which it is acknowledged to possess, and which it was his ardent wish that it might ever maintain. Mr. MATTHEWS was favoured by nature with a good understanding, which he improved by study and unremitting industry from an early period; whereby he was peculiarly fitted for the important station assigned to him in this Society. In proof of this assertion, we have only to refer to his various communications, distinguished by good sense and philanthropy, which appear in our volumes. To the circle of this Society, widely diffused as it is, the fame of Mr. MATTHEWS was not confined; Foreign Societies appreciated his merits. On the 30th

of Nov. 1787, he was admitted an associate of the Royal Society of Lyons; and on the 5th of Nov. 1801, he was elected an honourary member of the Dublin Society. On his private excellencies, this is not the place to enlarge; and of his unostentatious charities, the recollection of his modesty in the performance of them forbids any recital. By all who knew him his virtues will ever be held in respectful remembrance. In honourable testimony of his various talents, and of the advantages derived from the constant exercise of them, and also of our unmixed esteem for his private worth, we must add our tribute of sincere regret for his loss; and as we know so well your high estimation of the deceased, we are sure that you will warmly coincide with us in this sentiment.

In conclusion, we have to request that the Society will accept our congratulations on its present prosperity, and the well-founded expectation of its permanent stability. And here, Sir, it would be injustice to you, to overlook the singular and essential services which you have afforded to it on all occasions, and in particular the late renewed proof of your perpetual watchfulness over its interests. We allude to your judicious and indefatigable exertions, by means of which our Funded Property, (endangered, in the greatest degree, through the failure of our

late bankers,) and all the dividends due upon it, have been completely recovered.

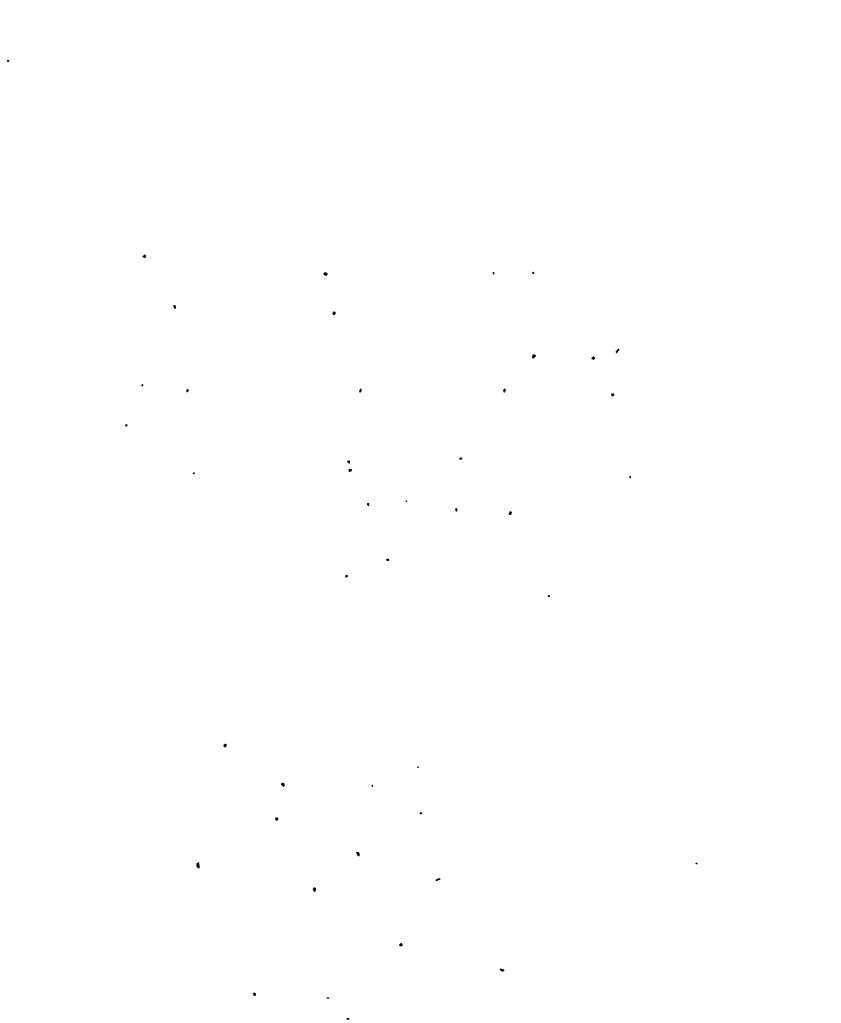
That you, Sir, may be long preserved in life and health, and the Society continue to enjoy the important benefit of your services, as its President, is the ardent wish of every Member of the Society, and of none more than

Your most obedient,

And most humble Servants,

C. G. GRAY,
W. B. BARTER,
T. GRÆME,
R. CRUTTWELL,
M. MAPLETOFT,
W. H. DOUCE,
CHAS. PARRY,

Members of the Superintending Committee.



LETTERS

TO THE

BATH AND WEST OF ENGLAND AGRICULTURAL SOCIETY.

ARTICLE I.

Proceedings of the Annual Meeting 1814.

THE Annual Meeting of this Society was holden, at their Rooms in Hetling-House, Bath, Dec. 13, 1814,

Sir B. HOBHOUSE, Bart. M.P. F.R.S. &c.

President, in the Chair;

THERE WERE PRESENT ALSO,

Earl of Cork,	W. Dyke, esq; V. P.
Right Hon. Lord Gwydir,	Dr. Parry, V. P.
Hon. E. J. Arundel,	C. G. Gray, esq; V. P.
Sir J. C. Hippisley, bart. M. P. V. P.	J. P. Paul, esq; V. P.
	Sir J. W. Smith, bart, V.P.
William Dickinson, esq; M. P. V. P.	Rev. W. B. Barter, V. P.
	T. Græme, esq; V. P.
W. G. Langton, esq; M. P. V. P.	Chas. Phillott, esq; V. P.
	Wm. Clavill, esq; V. P.

Rev. Sir Chas. Rich, bart.	J. R. Lucas, esq;
P. W. Baker, esq, M. P.	E. D. Grosvenor, esq,
T. G. Estcourt, esq; M. P.	Colonel Horner,
Major-Gen. Sir William Cockburn, bart.	Charles Knatchbull, esq;
Sir Paul Bagott,	J. Benett, esq; President of the Wiltshire Agricultural Society,
General Fane	
General Michel,	Gabriel Goldney, esq.
R. Astley, esq;	J. W. Weston, esq;
H. Biggs, esq;	J. Ensor, esq.

And a large assemblage of Gentlemen of Landed Interest from the Western and distant Counties.

Agreeably to the established form of the Society, the choice of officers took precedence in the order of business; and Sir B. HOBHOUSE, bart. M. P. &c. &c. was unanimously re-elected President of the Society. The Vice-Presidents were also re-elected; and the permanent Committees were continued, with some alterations, and in some instances enlarged.

A claim having been made by Sir J. C. Hippisley, for the premium proposed last year by the Society for the cultivation of Dr. Richardson's Fiorin Grass, and a report in his favour having been made by a special Committee appointed to view the crop, the Meeting unanimously agreed that the Premium be awarded to him. When the premium had been thus adjudged, Sir John stated that it was his intention

to accept of half that sum only, which he would appropriate as a reward to his Farm Servants, for their attention in the experiment; and would leave the other half in the hands of the Society, to be given "*for the best Essay, or Re-*
"*port, founded on the Writer's own experience,*
"*on the Cultivation and Application of Fiorin*
"*Grass to the useful purposes of the farm and*
"*dairy.*" Sir John at the same time laid before the Society a very particular statement of the progress and result of his experiment; and exhibited some butter, of most delicate flavour, made from cows fed on fiorin grass exclusively.

The Society, ever mindful of the wish expressed by their Royal Patron that their attention should be directed to the cultivation of Dartmoor; and having for many years proposed premiums for various crops to be raised thereon, such as were thought most likely to be brought to perfection in any part of that district, none of which premiums have been claimed; this year proposed as a subject for the Prince Regent's premium, "the best Treatise on the Soil
"and Climate of Dartmoor, founded on ob-
"servations and local knowledge, explanatory of
"the cause or causes which have prevented the
"whole or any considerable part of that extensive
"district from having been brought into cul-
"tivation; of the best means of counteracting,

" if any be practicable, such cause or causes;
" and generally, as far as the strata of terrene
" substances and atmospheric influence are
" concerned, pointing out in what manner it is
" most likely that the one may be meliorated, and
" the other rendered less noxious to vegetation.

The subject of the Commutation of Tithes (by the promise of a high honorary reward from the Society) having engaged the attention, and drawn forth the abilities, of several good writers; it had become the task of a special Committee to investigate the merits of not less than six treatises in claim of the Bedfordean Gold Medal. After very mature deliberation, the Committee recommended one, whose signature corresponding with a sealed paper which contained the writer's name, was found to have been written by John Benett, esq; of Pit-House: to John Benett, esq; therefore, the Bedfordean Gold Medal was unanimously awarded for " the " best Treatise on the Commutation of Tithes."

A motion was then made by J. Ensor, esq; of Rollesby-Hall, in Norfolk, seconded by J. Webbe Weston, esq; of Sutton-Place, Surry, and adopted by the Society, that a Petition should be immediately prepared for a Commutation of Tithes, founded on the principles of the said essay. A petition is accordingly preparing, which in a few days will be laid on the

table in the Society's Rooms, for the signatures of those who may approve, whether members of the Society, or otherwise.

So much information, and so many good hints, having been acquired from the perusal of all the Essays on the Commutation of Tithes, the subject for the Bedfordean Gold Medal has been exchanged for the "best Essay on the Corn-"Laws, with reference to the present times."

On the motion of Mr. Ensor, seconded by Mr. Benett, of Pyt-House, it was agreed that Petitions to both Houses of Parliament be forthwith prepared, praying them to take into their immediate consideration the present distressed state of the agricultural interests of the kingdom, and to adopt such measures as in their wisdom may appear most expedient. Such petition having been prepared, received the sanction of the *Society*; and now lies at Hetling-House for the signatures of the Members, and others.

To the Society had also been presented an "Essay on the diseases of Wheat," in claim of a premium. After an attentive examination of this Essay, which evinced great depth of science, with much practical knowledge, a special Committee recommended it for the premium. The Annual Meeting confirmed the same, namely, a Piece of Plate, value Fifteen Guineas, to the author, the Rev. Robert Hoblyn.

After confirming these Premiums, the Meeting adopted the recommendations of Committees and General Meetings, respecting claims which occurred under the stated Classes arranged in their Premium Book, as follow:

Under CLASS I. (*Agricultural Operations.*)

To the successful candidates at the Ploughing Match in May last; namely,

John Benett, esq; Pyt-house, first premium, *Five Guineas.*

To Philip Whitaker, Bratton, second ditto, *Three Guineas.*

To George Rogers, manager of the first plough, a Coat and buttons, and *One Guinea.*

To John Newman, the manager of the second plough, a Coat and buttons.

To six other ploughmen, *One Pound Ten Shillings.*

The Premiums for Shearing at the Cattle-yard, during the June Meeting of the Society, were awarded as follow:

To George Ford, the first premium, a Coat and buttons, and *One Guinea.*

To Abraham Ford, the second premium, a Coat and buttons.

To Thomas Tyley, a Jacket and Buttons.

To James Tyley, for bringing 30 sheep for the experiment, *Two Guineas.*

[The method of Shearing prescribed by the Premium was allowed by the operators to exceed the mode to which they had been accustomed, better adapted to profit the farmer, and to set forth the excellence of their workmanship.]

To Thomas Tyley was awarded *Ten Shillings*, and to James Weeks, *Five Shillings*, for their zealous attempts.

To Mary Long, for reaping seven acres and a half of wheat in a skilful manner, during the late harvest, *Two Guineas.*

Under CLASS III. *(Crops and Plantations.)*

To John Benett, esq; for raising a crop of Turnips, by the Northumberland culture, for spring feeding, *Ten Guineas.*

The examining Committee reported that the weight of the turnips exceeded 38 tons per acre; raised on a farm remarkably clean, and in the highest state of cultivation.

Under CLASS IV. *(Live Stock.)*

To Charles Gordon Gray, esq; for exhibiting the best sample of Neat Cattle for breeding, a premium of *Ten Guineas.*

To Mr. Hughes, for the best Fat Ox, a premium of *Eight Guineas.*

To his Grace the Duke of Beaufort, second-best ditto, a premium of *Four Guineas.*

To John Benett, esq; for a Fat Ox, a bounty of *Three Guineas.*

To John Benett, esq; for the best Fat Heifer, a premium of *Eight Guineas.*

To John Benett, esq; for a Fat Cow, a premium of *Five Guineas.*

To Mr. Hughes, for a spayed Heifer, a premium of *Eight Guineas.*

To Charles Gordon Gray, esq; for the best Fat Steer, a premium of *Ten Guineas,*

[It is to be noticed that the premium for the best Fat Cow was adjudged to Mr. Brooke, but it appearing to the Meeting that he could not, according to the Rules, receive it, because he had obtained a premium for a similar object last year, the premium was transferred to John Benett, esq. In consideration, however, of the very surpassing excellence of Mr. Brooke's animal, the Society awarded to him a bounty of *Five Pounds.*]

To Wm. Tinker, esq; for exhibiting a pen of ten Merino Ewes for breeding, bred by himself, a premium of *Six Guineas.*

To H. Biggs, esq; a pen of South-Down Ewes, *Ten Guineas.*

To Mr. Isaac Kendall, second-best ditto, *Three Guineas.*

To Mr. D. Hayward, for the best fat Wether Sheep, *Six Guineas.*

To John Wiltshire, esq; for the second-best ditto, *Three Guineas.*

To John Cann, esq; for the best Fat Ewe, *Four Guineas.*

(Extra Stock.)

To an unknown exhibitor of a Devon Ox, a bounty of *Five Guineas.*

To Wm. Tinker, esq; for a Ram, and three Merino Wethers, a bounty of *Three Guineas.*

Under CLASS V. *(Wool.)*

To Mr. Christopher Garrett, for exhibiting six fine-woolled Shearling Rams at the June Meeting, a bounty of *Ten Pounds.*

To Wm. Tinker, esq; for exhibiting the finest Fleece from a British Ram, a premium of *Five Guineas.*

To ditto, for a British Ewe, a premium of *Three Guineas.*

Under this class of Premiums, several pieces of Navy Blue Cloth were exhibited. The exhibitor to whom the premium was adjudged was the manufacturer of the successful piece last

year, and consequently could not, according to the Rules, be entitled to the premium. To prevent the recurrence of these circumstances, it is hoped that claimants for any of the premiums of the Society will make themselves acquainted with the Rules; which they may do without difficulty, by applying to the Secretary, who has always books to deliver to those who will apply for them.

Under Class IX. (*Industry and Good Behaviour.*)

To Robert Pinckney, for 45 years faithful servitude in husbandry, *Three Guineas.*

To ditto, as labourer in husbandry, and bringing up 7 children, without parochial aid, *Three Guineas.*

To John Parsons, for 56 years faithful servitude in husbandry, *Three Guineas.*

To the Old-Cleeve Female Friendly Society, *Ten Guineas.*

(*Mechanics.*)

To Hugh Carson, the inventor of a windmill, on a new construction, a model of which was exhibited to the meeting, a bounty of *Five Pounds.*

During the Meeting, Dr. Wilkinson presented to the Society an interesting paper from the hand of a scientific Female Honorary Correspondent, Mrs. Agnes Ibbetson. This subject was referred to the Superintending Committee. The thanks of the Meeting were given to Mrs. Ibbetson for this communication; and to Dr. Wilkinson for presenting it, and making some brief remarks on its contents.

Resolved unanimously, that the Thanks of the Society now assembled at their Anniversary Meeting be given to the Superintending Committee, for their constant attention to the affairs of the Society, and for the zeal they invariably manifest to support its dignity and prosperity; and particularly for the very great pains they have taken to render the Cattle-yard a commodious and safe receptacle for the objects exhibited for Premiums, and for those regulations which have facilitated, beyond the experience of former years, the business of the judges; as well as for the comfort also consequently rendered to gentlemen who delight to view the improved and improving state of the country in point of live stock, of which this year's exhibition has afforded a pleasing example.

Resolved unanimously, that the Thanks of the Society be given to the Committee appointed

to adjudge the premiums for Live Stock, for the skill and impartiality manifested therein.

Resolved unnaimously, that the Thanks of the Society be given to all the permanent and occasional Committees employed in the affairs of the Society.

Resolved unanimously, that a Silver Bedfordean Medal be presented to Dr. Cogan, a veteran and zealous member of this Society, as a testimony of the high respect the Society feel for his merits and past services.

Resolved unanimously, that Dr. Wilkinson be requested to accept the situation of Chemical Professor to the Society, deemed vacant by the removal of Mr. Boyd from England.

The Thanks of the Meeting, with a Silver Bedfordean Medal, were voted to Mr. Thomas King, statuary, of Walcot-House, Bath; for a plaster bust of their late much-honoured Vice-President, Mr. Billingsley, which was presented by him to the Society.

Resolved unanimously, that the Thanks of the Society be given to Wm. Clark, esq; for an "Essay on the Management and Relief of the "Poor," under the signature "Philopolites."

Resolved unanimously, that the Right Hon. Lord Viscount Castlereagh be elected an Honorary and Corresponding Member of this Society.

The following gentlemen have become Members of this Society since the last Report:

Right Hon. the Earl of Cork,
Hon. J. E. Arundel,
Sir F. F. Baker, bart.
Gen. Sir Brydges Henniker, bart.
Count Orloff.

Charles Hassell, esq;
A. S. Lillingstone, esq;
Henry Lys, esq;
G. Lawrence, esq;
Alex. Erskine, esq;
John Myer, esq;
Capt. John Parish,
John Pearce, esq;
General Fane,
General Michel,
Dr. Gaitskell,
Rev. Wm. Battell,
Wm. Brown, esq;
Joshua Cuff, esq;
T. W. Dyke, esq;
J. Goodford, esq;
J. E. Strickland, esq;
Laylor Cooke, esq;
Samuel Davis, esq;
Walter Long, esq;
Mr. Thomas King.

The Thanks of the Meeting were unanimously given to the President, for the zeal and ability he at all times exerts for the welfare of the Society, and in particular for the signal care and vigilant attention he has shewn in the course of this year to its interests.

The Thanks of the Meeting were also unanimously given to Sir J. C. Hippisley, bart. V. P. who, during a short time that the President was obliged to be absent, took the chair.

By order of the Society,

R. RICARDS, Secretary.

Sketch of the President's, SIR BENJAMIN HOBHOUSE'S, SPEECH, *upon his Health being proposed after Dinner at the Anniversary Meeting of the Society.*

HE expressed himself greatly obliged to the Hon. Baronet (Sir J. C. Hippisley) for having proposed his health, and to the whole company for the very flattering manner in which that toast had been received. He said, the Hon. Baronet was correct in stating it to be the tenth time that he (Sir B. H.) had the honour of being unanimously elected President of this ancient and respectable Institution; and he added, that, although it was very easy to find among their numbers a President endowed with greater powers of usefulness, yet he would defy them to find one, who would set a higher value upon their good opinion. That good opinion he was sure he could not lose, unless he should deserve to lose it; and, therefore, if an event, of so sad a nature to him, could happen, he should have to attribute the blame entirely to himself; he should sink low, indeed, in his own estimation. But he trusted that such an event was not within the bounds of possibility; for it should ever be, as it had hitherto been, his constant endeavour to deserve the confidence which had been reposed

in him, and to merit the continuance of their favour. He was most happy to find that his humble services were still so acceptable to them; and to perceive that so lively and so warm an interest in his health and welfare was still taken by a body of gentlemen, so eminent for their intellectual powers, their public spirit, and their private worth. The repeated proofs of their esteem and approbation affected him deeply; they impressed him with gratitude and pride; they constituted more than an adequate reward for the little aid which he afforded to the Society; and incited him to make, if possible, still greater exertions in furtherance of the important national purposes, for which it was established.

In noticing the events which had taken place since the celebration of the last anniversary, the most prominent, and the most pleasing, he observed, was the restoration of peace in Europe; would that he could say in every quarter of the globe! As men, we might, however, congratulate ourselves that the sphere of devastation and bloodshed was become more limited, and as Britons, we might be proud of the leading part which this kingdom had taken in procuring the accomplishment of that blessing; but as members of an Agricultural Society, we had not as yet, nor as yet could it have been expected, any reason to rejoice in the event. Peace had usually

proved herself to be the fostering support of agriculture, and of all those arts which conduced to the dignity, honour, and prosperity of nations. Public burthens were diminished; the large sums, annually raised for the purposes of war, were expended in the internal improvement of the country; the wealth, set free from taxation, was converted to the encouragement of agriculture, the strongest and most durable basis of national strength, and independence. Such were the usual consequences of peace; whether such would *hereafter* become our happy condition, time would shew; at *present*, the agriculturist bitterly lamented that he had invested his capital in land; it was notorious that his situation was most wretched. The severe distress of the landed interest was a subject of vital importance, and had already properly engaged the attention of both Houses of Parliament; whose Committees had collected a great body of evidence, and were to resume their labours during the present session. Printed copies of that evidence he had transmitted to the Secretary, for the information of the Members. It gave him great pleasure to observe, that this respectable Society had determined to second the efforts made in Parliament by the friends of agriculture; and that a Petition to the Legislature, to take into consideration its depressed state, and grant relief, had

been this day presented to, and approved by, the Annual Meeting. Numerous had been the petitions against any alterations in the Corn Laws; and if the agriculturists, who at present suffered so much, did not bring forward counter petitions, it might be urged by their opposers in Parliament, that they were sensible they had no rational ground of complaint. Their enemies out of Parliament had made use of many allegations in their petitions, which, when the opportunity of verifying them was afforded, they made no attempts to substantiate. Let those engaged in agriculture shew that they sustain real evils, and not merely bring them under the view of Parliament, but adduce clear proof of their existence. The question was not to be decided by numbers, and by noise; it was not of that easy and uncomplicated nature, as was imagined. Although it was very desirable that grain, the food of man, should be provided for the nation at the cheapest possible rate, yet the interests of the country made it his duty to add, that it should not be cheaper than was consistent with the certainty, steadiness, and permanency of supply; or, in other words, with due encouragement to our own agriculture.—(*Hear! Hear! Hear!*) But he would enter no further now into the question. Indeed the hour of conviviality was not the most proper time for a long and elabo-

rate discourse. The subject was in the best and fittest hands, in the hands of Parliament. His ardent hope was, that the examination would be complete, and lead into a revision of the whole body of our Corn Laws; and his fervent prayer was, that the measures which should be adopted, might prove conducive to the general good of the nation.

He further observed, that it was also a source of gratification to him to witness their adoption, this day, of a resolution to petition Parliament for a Commutation of Tithe. He was sorry, after what he had stated last year, to be called upon to repeat, (but he found it necessary, in consequence of what passed this morning, to guard himself against misconception,) that until a substitute, securing the rights of all the tithe-owners, and giving them an honourable and liberal equivalent, could be found, he would rather bear, great as it undoubtedly was, the pressure of the existing evil. (*An universal cry of Hear!*) Although he knew that they had always agreed with him in that opinion, it was still gratifying to him to receive this renewed proof of it. He then enlarged upon the mischiefs attending Tithe; which mischiefs were, he said, aggravated by rendering it liable to the duties on property. On what principle this was done, he could not divine. Tithe, to the payer, was

either a diminution of profit, or an addition to his loss. It seemed to him a solecism in finance to tax, not the cultivator's profits, but his outgoings; not what remained with him after every deduction, but what was taken from him, or, in other words, the deduction itself; but to tax his loss was to add hardship to hardship, and to annex punishment to misfortune. He should hail the day when this subject of Tithe, in all its bearings, should be, by some man of genius and eloquence equal to the arduous task, introduced into either of the branches of the Legislature. Then the Essays, which had received the premiums, or notice, of the Society, would lend a powerful aid to the cause; then the labours of the Tithe Committee, in corresponding with various parts of the country, would be duly estimated, and received with the praise, to which they were so justly entitled. If once he could see Parliament seriously engaged in devising a commutation for this worst mode of provisioning the Clergy, he should think that his hopes were accomplished; he should anticipate the blessings which were to follow; he should anticipate the cultivation of our wastes with redoubled spirit, and an unbounded influx of wealth into the nation. "May the happy day be not far distant." (*Hear! Hear! Hear!*)

He next adverted to the Cattle Shew; and expressed his satisfaction that so uncommonly large a number of Live Stock, some of which was of excellent quality, was this year exhibited for the prizes of the Society. He attributed this advantage to the good accommodations lately built in the Cattle-Yard for the reception of the Stock, the largeness of the premiums, and the liberality with which unsuccessful candidates were treated.

He would trouble them with only one or two more observations. He was proud to see himself surrounded by so many distinguished characters; and when he considered how many of the same description were, elsewhere, at this time assembled, in pursuit of the same laudable undertaking, [he was supposed to allude to the Smithfield Club, which was then holding its annual meeting in London;] he reflected with satisfaction that this country produced men, not only eminent in war, and in raising the glory of the nation, but in the improvement of Agriculture, and the useful Arts.—The labours of the Society were, he said, of the highest order; they not merely concerned our own nation, but the world in general; whose welfare and happiness principally depended on the choice of the best means of securing a certain and ample supply of the first necessaries of life. He rejoiced that

their endeavours to promote the admirable objects of the Institution had been so successful; he had the delight of often hearing them made the theme of sincere and warm applause. If it should be asked, by what means and causes the Institution had obtained so great a degree of celebrity, the answer was plain, and obvious. In the selection of their principal premiums, they had always looked to important objects. They had made it their principal end to obtain facts; without which, as a basis, the superstructure must soon fall to the ground. In the conduct of experiments they had inculcated, that as little as possible should be left to subordinates and inferiors, lest different results should appear to flow from the same trials; and they had ever considered that a frequent, a very frequent recurrence of the same results was necessary to the establishment of any theory, or system. The Members of their Committees were peculiarly fitted for the duties, which they were called upon to discharge; and their judges were not only able, but fair and impartial men, who made it a practice not to recommend a prize to be awarded, unless adequate merit was discovered. In the admission of Papers into their volumes, they had wisely been nice, and discriminating; for the permanent character of the Society was determined by the publication of their transac-

tions; and he trusted they would never depart from this most important part of their duty. Such were the *means* by which the Society had risen so high in the public estimation; but the *cause* was in themselves; the cause was in their judgment, and zeal, which had so happily devised, and so promptly and so perseveringly executed those judicious measures. He was thoroughly persuaded that their ardour would never grow cool, and that their efforts would never slacken, "while there was one acre of "ground capable of higher cultivation, or one "article of skill, or industry, short of its utmost "possible perfection." The little assistance which he could bring into the service, should never be wanting. They might ever rely, that they would find in him the same zeal and devotion to the cause, and the same personal goodwill towards themselves. (*Repeated bursts of applause.*)

Article II.

Proceedings of the Annual Meeting 1815.

THE Annual Meeting of this Society was holden, at their Rooms in Hetling-House, Bath, December 19, 1815,

Sir B. HOBHOUSE, Bart. M.P. F.R.S. &c.

President, in the Chair;

THERE WERE PRESENT ALSO,

His Grace the Duke of Somerset.

Rt. Hon the Earl of Cork. | Rt. Hon. Lord Gwydir.

Sir J. C. Hippisley, bt. M. P. V. P.	Sir Wm. Wynn,
W. G. Langton, esq; M. P. V. P.	T. Calley, esq; M. P.
Dr. Parry, V. P.	General Michel,
C. G. Gray, esq; V. P.	Colonel Horner,
J. P. Paul, esq; V. P.	J. W. Weston, esq;
Sir J. W. Smith, bart. V. P.	John Ensor, esq;
Rev. W. B. Barter, V. P.	G. R. Seymour, esq;
Sir Alexander Hood, bart.	Charles Knatchbull, esq;
Sir Wm. Cockburn, bart.	H. Biggs, esq;
Sir J. Hawkins, bart.	Richard Spooner, esq;
Rev. Sir Chas. Rich, bart.	J. H. Moggridge, esq;
	John Benett, esq;
	Joseph Bissett, esq;

And a numerous assemblage of Agricultural Gentlemen from the Western and distant Counties.

The business of the day commenced by choosing Officers of the Society; when Sir B. HOBHOUSE, bart. M.P. F.R.S. &c. was re-elected President with unanimous approbation. The Superintending Committee was also re-elected and enlarged, together with the other permanent Committees, for the more easily executing the concerns of the Society in the different departments.

The President communicated to the meeting of yesterday, that his Grace the Duke of Somerset was desirous of giving a Premium of FIFTY GUINEAS, in aid of the great purposes for which the Society was established; and that to themselves, whom he considered the best judges, he entirely left the choice of the subject. —The meeting voted their unanimous thanks to his Grace the Duke of Somerset for his liberal donation, and also for having so handsomely committed to their directions the mode of its application.

The circumstances in which the Agricultural Interest is placed at the present period attracted (as was anticipated) a large number of Members of the Society, to devise what course would be proper to pursue in such distressful times. The business was brought forward by Richard

Spooner, esq; in a speech full of alarming truths as to the present state of the farming interest, and pourtraying the awful consequences that might follow, if some means were not adopted for its relief. His speech exhibited an extensive knowledge of the subject, was eloquent and animated, and he concluded with moving, "That "the present depressed state of the Agricultural "Interest of the country imperiously demands "the immediate consideration of the Legislature. "—That this meeting looks with confidence to "his Majesty's Ministers for promoting relief "from as large a part as possible of those bur- "dens which more immediately fall upon the "tenantry of the kingdom; particularly the Tax "called the Tenant's Property Tax, the Taxes "on Malt, Salt, and Horses used in husbandry. "—That our President be requested to make "known to his Majesty's Ministers, through the "medium of his Majesty's Secretary of State "for the Home Department, this resolution en- "tered into by this most ancient Society, insti- "tuted for the promotion of Agriculture, Arts, "Manufactures, and Commerce, emanating from "and comprehending all the western counties of "this kingdom."—Carried by a considerable majority.

The Meeting having taken into consideration the Report of the Tithe Committee, and the

question proposed by them to the Meeting, resolved that it would be inexpedient to enter upon so great an expense as would be incurred by further proceeding with the preparation of a Bill to be presented to Parliament; but that the important subject of a Commutation of Tithes be referred to the same Committee for the ensuing year, with authority to alter the Petition, and to consider whether any and what measures are proper to be adopted. John Benett, esq; was added to that Committee.

The Society having continued their promise of premiums for experiments on Fiorin Grass, the Rev. Mr. Barter presented an Essay or Report to the meeting on its cultivation and application. Former premiums have been awarded for experiments on the fiorin imported from Dr. Richardson's farm in Ireland. The present experiment was with the indigenous plant, the *Agrostis Stolonifera* of England. In this report are pointed out, the nature of the soil best adapted to its cultivation; the manner of planting it; its management through the different seasons; the luxuriance of the crop; its expense, in comparison with common hay; and the general result of the experiments. The premium claimed was awarded, and confirmed, as will appear in the following list of premiums and bounties confirming the recommendations of General Meetings and Com-

mittees through the past year, arranged as the classes occur on the Premium Book, namely,

Under CLASS I. *(Agricultural Operations.)*

To the successful candidates in Shearing, performed at the Cattle Yard during the Society's Meeting in June, as follows:

To Abraham Ford, the first premium, a Coat and buttons, and One Guinea.

To Thomas Tyley, the second premium, a Coat and buttons.

To Samuel Scrivens, the third premium, a Jacket and buttons.

To James Weeks, a gratuity of Seven Shillings and Sixpence, for his attendance and laudable attempt at improvement.

To — Tyley, a boy about twelve years of age, for exemplifying great dexterity in winding up the fleeces, a gratuity of Five Shillings.

To Ann Smith, of Bratton, for reaping 7 A. 1 R. 7 P. of wheat during the late harvest, a premium of Two Guineas.

Under CLASS II. *(Soils and Manures.)*

To the Rev. J. Cockin, for the discovery of a new manure, and disclosing it to the Society, a premium of *Five Guineas.*

Under CLASS III. *(Crops and Plantations.)*

To Wm. Tinker, esq; for raising a crop of Swedish Turnips, a bounty of *Six Guineas.*

Under CLASS IV. *(Live Stock.)*

To Mr. John Eason, for exhibiting the best Bull, Cow, and Offspring, all of the same breed, (the Devon,) the President's premium, value *Twenty Guineas.*

To Mr. John Walker, a meritorious competitor for the same premium, for exhibiting a Bull, Cow, and Calf, of the Herefordshire breed, (recommended by the judges) a bounty of *Five Guineas.*

To Mr. George Garlick, for the best Fat Ox, as feeder only, a premium of *Eight Guineas.*

[This Ox was of the Glamorganshire breed, and in the words of the Committee, "too "much cannot be said of its merits."]

To Mr. James Smith, for a Fat Ox, of the French and Devon breed, a bounty of *Five Pounds.*

To Mr. John Walker, for the best Heifer, of the Herefordshire breed, (as breeder and feeder,) a premium of *Ten Guineas.*

To Mr. James Smith, for the best fat Cow, of the long-horn breed, (as feeder only,) a premium of *Four Guineas.*

To Mr. Robert Hughes, for a Fat Cow, of the Herefordshire breed, (as feeder only,) a bounty of *Three Guineas.*

To Mr. John Eason, for three Heifers for breeding, three years old, Devons, a bounty of *Five Guineas.*

To C. Codrington, esq; for the best fat Wether Sheep, (mixed breed,) a premium of *Six Guineas.*

To — Stephens, for a remarkably fine fat Ewe, exhibited as extra stock, a bounty of *Three Guineas.*

To Wm. Dyke, esq; for folding the greatest number and most profitable sort of Sheep, a premium of *Ten Guineas.*

To the Rev. Sir Charles Rich, bart. for breeding and keeping the greatest number and most profitable sort of Sheep, and sending an explicit account of the experiment, a premium of *Ten Guineas.*

Under CLASS IX. *(Industry and Good Behaviour.)*

To Richard Shadwell, for forty years faithful servitude in the family of a Member of the Society, a premium of *Three Guineas.*

To George Frend, a labourer in husbandry, a premium of *Three Guineas.*

Under Class X. *(Essays.)*

To the Rev. W. B. Barter, for the Cultivation of Fiorin Grass, accompanied with an Essay or Report on his Experiment, a premium of *Ten Guineas.*

The Committee of Mechanics reported, that they had witnessed the effect of Mr. Pope's new principle as applicable to Wheel Carriages; that it appeared that, in *ascents,* the draught is considerably facilitated by a very simple arrangement, which distributes a portion of the load on all the horses, and thus gives them a greater purchase; and on *descents,* the load is thrown on the hind wheels, by which contrivance there is no necessity for any drag, and no pressure upon the horses.—The Carts and Gigs have an admirable additional principle. By a rack work, the body of the cart and gig can be regulated with the point of suspension, and very easily adjusted in any degree of ascent and descent.—These inventions being patent, an exhibition was made of the carriages to the Society without any expectation of a premium; but as a consideration for the expense of bringing them from Bristol, the Society, on the recommendation of the Committee, awarded to Mr. Pope a bounty of *Five Pounds.*

Capt. Thornhill exhibited a Gun of French construction, which is charged in the breeching, and discharged upon the principle of percussion; it is not only protected from the influence of weather, but also admits of being loaded and discharged six times quicker than a common gun: it has no recoil, and acting upon the charge in a right line, ensures its hitting the object.—Thanks were voted to the Captain for the exhibition.

Resolved, That the Thanks of the Meeting be given to the Superintending and the other permanent Committees, for their zeal and attention in directing the affairs of the Society during the intervals of the General Meetings.

Resolved, That the Thanks of the Meeting be given to the Gentlemen who undertook to be the Umpires in deciding on the merits of the Live Stock, and for the judgment and impartiality displayed in their adjudication. The Live Stock was of excellent quality, and made an admired exhibition. The arrangement that had been made in the Yard, both for the accommodation of visitors, and the comfort and protection of the animals, (under the particular direction of Mr. Charles Gordon Gray and Mr. Lewin Tugwell,) was highly praised by the Exhibitors, as well as by the Members and Strangers, as calculated to ensure an increased

competition at future periods, and consequently to promote the reputation and utility of the Society.

The Thanks of the Society were given to William Stoddart, esq; for the model of a frame to be used in shearing sheep.

His Grace the Duke of Somerset was unanimously voted a Vice-Patron of this Society. His Grace expressed the high sense he entertained of the distinction bestowed upon him, and that he should be ever ready to promote the great objects of the Institution.

The Right Hon. Colonel M'Mahon, private secretary to his Royal Highness the Prince Regent, was unanimously elected an Honorary and Corresponding Member.—Col. M'Mahon, being informed of this proceeding, attended the Meeting, and at the same time that he offered his acknowledgments for the honour which had been conferred upon him, he assured them of the attachment of his Royal Master to the Society and its important objects, and of his Royal Highness's high respect for the gentlemen of whom it is composed.—Col. M'Mahon was then addressed by the President, who stated that the Society felt, and ever should continue to feel, the most lively sense of gratitude to his Royal Highness the Prince Regent, for his condescending goodness in becoming its Patron, and for

the munificence of his annual donation; and that Colonel M'Mahon was esteemed by the Society a most valuable accession to the list of its Members.

To the list of Honorary and Corresponding Members were also added, by unanimous vote, the following gentlemen, viz:

Joseph Quincey, esq; Secretary to the American Academy of Arts and Sciences, Boston.

John Lowell, esq; Secretary to the Massachusets Agricultural Society, Boston, North-America.

Colonel Compton, Prince Edward's Island, North America.

Sir Chas. Morgan, bart. Tredegar, Monmouthshire.

The following gentlemen have become Members of this Society since the last Report:

Mr. Serjeant Best,	Sir Wm. Wynn,
Wm. Vaughan, esq;	Mr. J. Eason,
Wyndham Lewis, esq;	Mr. W. Falkner,
Thos. Lechmere, esq;	G. Holford, esq; M. P.
Dr. Morison,	Isaac Neate, esq;
Jos. Woollams, esq;	Henry Seymour, esq;
Dr. Fisher,	J. H. Hunt, esq;
Rev. W. Wilkinson,	Rev. Mr. Batchelor,
Robt. Nicholson, esq;	H. C. Bowen, esq;
T. G. Bramston, esq;	John Fisher, esq;
Mr. J. Walker,	R. D. Sherston, esq;

Mr. Robert Gourlay having by advertisement, and placarding against the walls of Bath, made

an attack, as gross and virulent as it was unfounded, upon the Society in general, and in particular upon what he termed the Executive of the Society, he was called upon to state whom he meant by that term, and explained that he did not mean any person in particular, but all the Members as a body. He was required to make an apology as public as his foul and unjustifiable aspersions had been, and declining to comply, he was expelled the Society.

The Thanks of the Society were unanimously given to the President for the zeal, ability, and intelligence, which had so eminently distinguished his conduct in the chair during the many and arduous concerns of this anniversary.

By order of the Society,

R. RICARDS, Secretary.

Sketch of the Speech of the President, Sir BENJ. HOBHOUSE, Bart. *after Dinner, upon the proposal of the* DUKE OF SOMERSET *to drink his Health with three times three cheers, being received by the Company with loud and repeated shouts of approbation.*

THE Hon. Baronet began by observing, that although he had been so often placed in circumstances to thank the Company for their flattering notice of him, yet he found it impossible to remain altogether silent. He must obey the impulse of his feelings, and reassure them, that every sentiment of his heart concurred to make this testimony of their approbation highly gratifying to him. The longer the connection between him and them had lasted, the dearer it had become to him; and therefore they might well imagine how satisfactory it was to him to perceive, that *their* sensations were in unison with *his*, and that he was uniformly and invariably received among them with the strongest marks of favour and kindness. When he contemplated the character and respectability of the Members of the Society, he felt the greatest pride in having his name associated with theirs; and he was confirmed in his judgment that its objects were of infinite importance to the nation: their patriotic

exertions were deserving of the public gratitude, and applause.

The complexion of the times was, the Hon. Baronet observed, still more unfavourable to the cause of Agriculture, than when they assembled last year. He was not surprised that the extreme distress of the landed interest had brought together so numerous and so distinguished a body of gentlemen, and had produced so long and so animated a discussion this morning. He had paid the closest attention to all the arguments which had been offered during the debate, and had no hesitation in declaring, that, in his judgment, the contending opinions had been most ably supported. He had not delivered his own sentiments, because it would have been irregular for him, while sitting in the chair which through their partiality he had so long filled, to have done more than enforce their rules, and suggest modes of proceeding for their adoption, or rejection. He would now, with their permission, as the evening sitting for business was not resumed, and the same objection, therefore, did not exist, state, with deference, the observations which had presented themselves to his mind on this highly important subject. He feared that he must trespass on their attention for a considerable time. *(An universal cry of hear! hear! hear! go on! go on!)*

There was one point, the Hon. Baronet said, in which all the various speakers had concurred, namely, the extreme distress of those engaged or concerned in agriculture. The fact was indisputable, and exhibited itself under multifarious forms. Tenants at will had, in the greatest numbers, sent notices to their landlords that they would quit their farms; and they must quit them, unless a compromise between them and their landlords, by a reduction of rent, should previously take place. The tenant upon lease had no such remedy. He could not take leave of his landlord, but must depend entirely upon the line of conduct which his landlord might think it right to adopt. A few landlords, possessors of considerable property and wealth, had either advanced money to assist their tenants in harvesting their crops; or had agreed to wait for their rent; or had voluntarily proposed a future abatement of it. But the great mass of landlords, compelled by their own necessities, had, by calling for their rents at the regular periods, driven their tenants either to borrow of the corn-jobber upon terms very disadvantageous to themselves, and very pernicious to the nation at large; or to sell their housed corn, or even their standing crops, at a low and losing rate. The distress of the occupiers of land was most severe, and widely diffused. Many tenants,

as appeared by the numerous advertisements in the newspapers, were obliged to sell their stock at any price, and quit their farms; and many of our honest yeomanry were at this moment either dependent on the poor-rates for a bare maintenance, or dragging out a miserable existence within the walls of a prison. This was the sad condition of the tenantry; and with respect to the proprietors of land, the small proprietors in particular, who had been accustomed to live upon a contracted scale, the income from their land being their only resource, it was with the greatest difficulty that they procured a subsistence. Numbers of them had been necessitated to offer their estates for sale at any price, even the lowest; those estates which had descended to them through a long line of ancestry, and which it was their wish, from an honourable, laudable, and useful pride, to have transmitted entire to their posterity. The Hon. Baronet said, gentlemen would observe that he had spoken in general terms only; the information of each of them would, he was sure, supply an afflicting, and too well-authenticated, detail. He wished he could think it possible that his statement would admit of contradiction. Whither, alas! he exclaimed, would this sad state of things lead, if no timely change of circumstances could be effected? In some instances

the cheapest, which was often the most inefficient and worst species of husbandry, must be pursued, the inevitable consequence of which was a considerable diminution of produce. In other instances, where returns would not pay the expenses of cultivation, the land would be suffered to lie waste. This must *continue* to happen, for it had already happened, to many tracts of vast extent, and particularly to the poorer tracts of land. Nothing could be more painful to him than to dwell upon this theme. Who could contemplate, without the deepest sentiments of melancholy, without the greatest horror, landlords almost without income, and absolutely standing in need of relief from the property tax; tenants reduced to the extreme of poverty; labourers without employ, and without bread; the number of paupers increased, and the means of supporting them diminished; and the country, this great and powerful country, after having dictated terms of pacification to the world, in actual and imminent hazard of being obliged to seek an uncertain subsistence from foreign nations, when it might be had in abundance from its own fruitful soil, without risque or chance of interruption? The present and the future were alike objects of gloomy consideration.

That the immediate cause of this great suffering of the landed interest was the low price of grain, and other agricultural produce, could not, he said, be doubted; for when the prices were higher, the farmer could pay his rent, taxes, and assessments: but what was the cause of this strange and extraordinary depreciation of wheat and other grain? strange and extraordinary he must call it. The supporters of the late Corn Act were in hopes of an advance of price; the opposers were fearful of it. He saw no reason why one side should triumph over the other, for each was equally mistaken. In truth, that Act, though it might hereafter prove to be useful, had been hitherto inoperative. There was no foreign corn in the kingdom but what might have been here, whether that Act had passed or not; nay, whatever corn there now was in the country, as it was under the King's lock, it could not produce any effect, except as far as it represented a portion of inert capital. Foreign corn had been long excluded from our markets; and yet notwithstanding this exclusion, and notwithstanding the heavy pressure of taxes and assessments, which had a natural tendency to force prices upwards, yet how great and how rapid had been their declension. Was he not, therefore, justified in speaking of that declension as strange and extraordinary? it was so, it was

an anomaly in political economy. There must be some counteracting cause, or causes. It had been urged by some that, in consequence of the low price of gold, the Bank of England was importing it in great quantities with a view to the resumption of cash payments; and that the Bank had therefore considerably contracted its discounts. That such a measure would produce a depression in the price of all articles was most clear; for the greater the quantity of circulating medium, the less was the value of each portion, and consequently the less would it purchase: but he doubted the fact. He had, he thought, the best reason for believing, that the Bank of England had been as liberal in its discounts as at any former period; and as to the supposition that the Bank was acting otherwise at the interference of Government, as had been asserted that morning, it was almost unnecessary to say, that at all events it was entirely without foundation. It was a Government which would spurn to intermeddle with the commercial concerns of the Bank, which better understood its duties than to throw obstacles in the way of exchange and circulation, and which sufficiently knew that to impede the internal trade of a country was to destroy its revenues. But if the conduct of the Bank of England was not the cause, it might be asked what was? This

question was not easy of solution;—was the following any thing like an answer to it? Had there not been an abundant harvest in 1814, although some part of the produce was not in good condition? Was not much foreign corn of the best kind imported at that time, when the Corn Bill was considered as only postponed to another session; which corn, from its superior goodness, attracted a sale in preference to our own, and thus left a great quantity of our's upon hand? Might not these circumstances have occasioned the first depression of price; and when once the price began to fall, was it not easily conceivable that it should fall very fast? The taxes must be paid; these and many other demands could not be postponed; the banker is applied to for a loan, who, seeing that the crop is reduced in value, refuses aid; and while he inconveniences the farmer, he diminishes the portion of circulating medium, and thus further reduces the current prices of all goods. The corn must be carried to market, and sold at any rate. When numerous sellers, anxious from absolute necessity to dispose of their commodity, became competitors in the market, the price must unavoidably sink very very low indeed. And if to this circumstance it were added, that a great purchaser, who must buy, was nearly taken out of the market, the

deplorable condition of the seller must be severely aggravated. There were no fleets, or armies, now to be fitted out for foreign service. Nay, a considerable armed force, which had been accustomed to be supplied with grain and meat purchased in our markets by the public contractors, was now maintained upon the produce of the French soil. We used to have venders who could afford not to sell, and purchasers who were obliged to purchase. We now had no purchasers who were immediately compelled to buy, but venders who must sell without delay. In this statement might be found, perhaps, an explanation of the causes, or of some of them at least, which have occasioned the present low price of grain.

The next question was, what was the proper remedy for the existing distress, and threatening ruin, of the landed interests? To his mind one of three ways only could be adopted. The first was to raise prices until they were proportionate to rents, necessarily advanced as they had been by the burthens laid upon the country in general, and upon the land in particular. The second was to lower rents to prices by reducing those burthens. The third was to adopt a course which is a mixture of the other two, viz. to lower as much as possible the existing burthens, and to allow the farmer an advance of price

proportionate to the remaining weight of his outgoings.

With respect to the first, he had heard a remedy proposed, which was the last that he should be inclined to adopt. To put as much paper as possible into circulation, or, in other words, greatly to increase the circulating medium, had been strongly recommended by many very sensible men; by which means the value of money would be lowered, and of course the price of commodities raised, and thus we should again give great prices for our provisions, and labour; and our manufactured goods would again be so dear, as to disable us from competition in foreign markets, which, by the return of peace, were opened to us. Of the same class of remedies was a bounty on the exportation of corn, and it was evidently no less objectionable. To no plan of raising prices would he on any account in the smallest degree resort, unless compelled by the overbearing dominion of circumstances.

As to the second plan, namely, that of bringing down rents to prices, the manufacturer and commercialist would be well pleased with it. Ask them what was the remedy for the sufferings of the tenantry, and their immediate answer would be, "let the landlords lower their rents, "and all will be well; they raised them to an "excessive height, and they are now called

" upon to forego the advantages they have en-
" joyed." That a few persons raised their rents during the war in an overstrained degree, he was not inclined to deny: the generality, he believed, did not. The positive amount of rent was not the point to be considered. Rent might be positively high, and at the same time relatively low; low when compared with the burthens imposed upon it. When taxes increased, could it be expected, that while other classes demanded, and justly demanded, an increase in the articles in which they dealt, the landed interest alone should be passive? There was no time that the general mass of land-owners possessed greater advantage with their increased rents and high taxes, than they enjoyed with low rents and few burthens. Indeed it might easily be made to appear, from authentic documents, that rents had within the last twenty years borne a far less proportion to the gross produce of the land, than they had before that period. This outcry against the landlord was altogether unjustifiable; who only desired, like other dealers, a fair profit, one by which he could live himself, and which was not inconsistent with the welfare of the other classes of his fellow subjects, and the prosperity of his country. But would this remedy, of lowering rents, answer the purposes of the manufacturing

and commercial class; would it promote their well-understood, their permanent interests? Would it make all well with them, to use their own language? The Hon. Bart. apprehended that they would experience the very reverse. If the landlord abated his rent in so great a degree as to meet the price to which grain was reduced, he must make a considerable diminution in his expenditure. Would not those tradesmen with whom he had been accustomed to deal, find that the demand for their commodities had been contracted, and would they not in their turn cry out that they were ruined? The first in the class of sufferers would be the venders of luxuries—there retrenchment would begin, and afterwards it would extend its course —the merchant, also, would suffer—he would scarcely find purchasers for his goods at any rate, however low. And was not this, in part, the case already? Many landlords had already considerably lowered their rents; and the commutations for tithes had, in many parishes, been reduced. A proportional economy in those who had made these abatements had followed. The tradesmen already proclaimed their sufferings— the towns already complained as loudly as the villages. And did not the distress of the manufacturing and commercial class react upon the landed interest? If they could not dispose of

their goods, or were obliged to sell them at reduced prices, they must consume with greater economy, and therefore be purchasers in a diminished degree of the produce of the soil. In this universal distress the revenues of the state would fall off, and sink into decay. Private misery, when it prevailed to a great extent, was public weakness. Hence it was seen, that let the wheel of distress begin its motion from any point, namely, from any description of men, it would not stop until it had completed its round; and that the interests of all classes were one and the same—they were bound up together, and could not be separated. "Why then are we to "hear," said the Hon. Baronet, "of a struggle "between the landed and monied interests? "Why are jealousies between them to be excited? The prosperity of the one includes the "prosperity of the other, and one cannot suffer "without inflicting injury upon the other. Let "one endeavour to rise upon the ruins of the "other, and both will be a common wreck; "with this difference only, that the class, which "produces food, will be the longest liver. Let "each give a liberal assistance to the other, and "both will secure their own advantage, and the "benefit of that country, which gives to them "their nutriment and support." The Hon. Baronet next stated, that he was aware it might

be said, " the land-owner will not long be ob-
" liged to practise a system of economy so ruinous
" to the other classes of society. The expense
" of what he consumes will be reduced, and thus
" he will be benefited." That he would derive some relief from the cheapened produce of the soil, was certain. As yet that was not the case; there was no proportion between the present prices of grain and cattle, and those of bread and meat. The venders of the necessaries of life were always the last to lower their prices, but they must yield at last. Others, seeing their considerable profits, would set up in the same concern, and contenting themselves with more moderate advantages, would undersell them. Thus capital would come into competition with capital, and break down combination—then prices would fall. But this benefit, arising from the more cheap purchase of landed produce, would be very far from removing, although it might alleviate, the distress consequent upon present prices, unless taxes and rates could be reduced to the state, in which they were when the same prices formerly prevailed. Then, and then only, would low prices of provision bring with them their usual blessings—cheap labour, cheap manufactures, and flourishing commerce. But could any reasonable man hope the return of those golden days? Though restored to

peace, was there any ground to expect a sufficient and adequate removal of taxes, and other burthens? Retrenchment should, and he had no doubt would, be practised in every branch of the public expenditure. In the military and naval departments, the expense should, and certainly would, be contracted, as far as was consistent with public safety, and with the maintenance of that military spirit, essential to the independence of this kingdom, and to the character which it held amongst nations. But was any one sanguine enough to think that taxes could be so far diminished, as to give material relief? The national debt had risen to such a height, that the very interest of it was now so great, as to make a vast load of taxes inevitable. He had heard it said, that the interest upon the debt might, by an Act of the Legislature, be lowered. How was this to be done in an honest manner, how done without a fraud upon the public creditor? A repeal of the taxes which pay the interest of the whole, or of a large portion, of the redeemed debt, amounting to more than two hundred and thirty millions, from which redemption the public had never yet felt any advantage, would certainly be no trifling alleviation; but in such case the Sinking Fund must, in violation of the faith of Parliament pledged to the Fundholder, be either entirely

destroyed, or terribly crippled in its movement. He knew no method but what was exceptionable, and full of difficulty, and dangerous in point of precedent, of removing any very considerable portion of existing burthens, notwithstanding the cessation of war.

What then remained, but to adopt a middle course? It appeared, that to make it the sole object to restore prices to their former height was at variance with the dictates of sound national policy, and that to lower rents in a degree proportionate to present prices would not be effectual to the removal of the existing evil without such a reduction of public burthens as was altogether impracticable and hopeless. While, therefore, we exerted our utmost to relieve the country from the pressure of its burthens, we should teach ourselves to acquiesce in some advance of the present prices of wheat and other grain. The price of wheat was now the same, or nearly the same, as in the year 1792, before the breaking out of the war. *The Honourable Baronet here entered into a statement, shewing how enormously the national debt, the annual taxes, and the poor-rates, had increased between that time and the present;* and then asked, whether it was possible to do away the monstrous differences, except by the almost entire annihilation of the national debt, which

was only to be accomplished by such means as no honest man could contemplate without abhorrence. Taking this to be the fact, the Hon. Baronet observed, that, in order to induce a continued cultivation of our own soil, we must submit to pay a higher, perhaps a much higher, price for our grain than in 1792. We must, he said, unless we were willing that our own agriculture, the best basis of national strength, should quickly decay, and finally be destroyed; and that this great and powerful nation, with its increased population, should be compelled to depend for its very existence upon a precarious supply from foreign countries. Present prices, present rents, and present burthens, could not long co-exist. The greater part of the present burthens was incurred during war, and many of them must remain during peace. The nation must not expect peace prices with war burthens. Every unnecessary burthen should be *first* removed, and if *afterwards*, when compared with the unavoidable taxation which remained, prices should be too low, legislative methods of increasing them should be resorted to as matter of painful necessity. But this may not then be the case; their present very great depression may prove to be the effect of temporary causes.

The Hon. Baronet added, that he had ventured at some length to offer the observations which had occurred to him in the consideration of this difficult and important question. To their better judgment he left the decision. He was never confident in his opinions, and he was less so on this, than on any former occasion. He was not sufficiently skilled in political economy to present himself to *any audience* as a competent judge of the complicated interests of a nation, (whose present advantage, it must be remembered, was often at variance with its permanent welfare and prosperity,) much less to the *enlightened assembly* which he had now the honour to address.

One point only remained to be noticed. Ought this Society, justly esteemed for the essential service it had rendered to the country, by having contributed so much to the improvement of its agriculture, to remain a silent, it could not be an indifferent spectator of the prevailing distress and impending ruin of the landed and farming interests? The judgment of this day had pronounced otherwise—had pronounced that a public proceeding should be adopted. He should execute their will with the same promptitude as on all former occasions, and nothing should be wanted on his part to give effect to it. With respect to the usual occupa-

tion of the Society, that in which it had been so eminently useful, he meant the keeping alive the spirit of agricultural improvement, he feared that little, if any thing, was to be done in that way during the ensuing year. They had heard this day several papers relative to the use of burnt clay as a manure. Of what use was it to exhort the farmer to try the effect of torrified clay on his arable land, when scarcely a motive for tillage was left? They had heard, also, an account of the Flemish mode of preventing blight in wheat by preparations of copper; but of what avail was it to encourage experiments for the prevention of disease in wheat, when almost every inducement to sow it was at an end? The energies of the Society could have, for some time to come, little scope for action. The carreer of its success was checked; but "we must not, therefore," exclaimed the Hon. Baronet, "sleep at our posts. The interests "of the country demand your vigilance; and that "consideration alone will, I am sure, prevent any "relaxation of your zeal. As it is much more "difficult to rouse and reanimate a spirit of agri-"cultural experiment than to give it birth, it will "be incumbent on us all to seize the first, and "every favourable, opportunity for pursuing the "great and laudable ends of our Institution "with renewed ardour and diligence."

After making several other observations, the Hon. Baronet concluded his Speech, which was frequently interrupted by universal bursts of applause, and which was considered by all as one of the most eloquent, able, and impressive speeches ever heard within the walls of the Society, with proposing as a Toast—"*God speed the Plough.*"

ARTICLE III.

Prize Essay on the Diseases of Wheat.

[By REV. ROBERT HOBLYN.]

"Rubigo maxima segetum pestis."—*Plin.*

THE Premium intended to be given by the Bath Agricultural Society to the person who shall ascertain the cause, and the best practical means either of prevention or cure of the several Diseases of Wheat, not having yet excited the production of any work in elucidation of the subject, deemed worthy of publication, and consequently not having been awarded; the writer of the following pages having consulted a number of authorities, and examined a

variety of theories, and having been for several years in the habit of making notes of his own observations and experiments, as a practical agriculturist, is induced to submit the result of his labours to the notice of the Society; offering his own opinions with deference, and disclaiming, at the same time, all intentions of illiberal animadversion, or invidious censure, on the productions of others who have written before him on the same subject: not thinking his time employed in a fruitless research, if, in the course of this investigation, even one useful inference should be conducive to detect the falsity, or expose the absurdity, of any received opinion; or to enlarge the bounds and scope of agricultural knowledge. At all events he will secure to himself this consolatory reflection, that if his propositions do not establish any decisive or incontrovertible truth, they will not contribute to the dissemination of any pernicious error.

Various notions have been entertained by naturalists, relative to the growth and formation of plants; *gravitation, capillary attraction, the force of the sap, and the living powers of the plant itself*, have each their respective advocates; the latter seems to be the most generally accepted theory; since every system is liable to insurmountable objections, which does not admit one general, active, energetic principle to pervade

the whole vegetable kingdom, emphatically stiled, *the Life of Vegetation*, or *the Vegetative Principle*, originally assigned to it, at the time of the creation, by this ordinance of the ALMIGHTY; "*Let the earth bring forth grass, the "herb yielding seed, and the fruit-tree yielding "fruit after his kind, whose seed is in itself upon "the earth.*" And in conformity to this first impression, the same undeviating and unalterable law of nature does still subsist, and has invariably subsisted throughout all ages; and the same ordained rule and original innate propensity is prescribed to every kind of seed, in the developement and expansion of the leading features of germination, *to take root downward, and to bear fruit upward.*

It being assumed, therefore, that every plant is governed by a living principle; its growth and progress to maturity is effected by the organization of its *botanical structure;* and the solidity and fixation of its integral parts, by the arrangement of its *chemical composition*; and its decay and consequent progress towards dissolution is effected by the disorganization of its physical structure, and the decomposition of its chemical constituents.

Whenever disease, whether occasioned by a botanical or chemical disarrangement, ob-

* Genesis i. 11.

structs the progress of the plant towards its destined maturity, it must, of necessity, be followed either by natural or premature decay; each being a certain prelude to final dissolution.* On the establishment of this proposition the whole reasoning of the essay is founded.

The manner in which vegetable substances are produced and organized not having been discovered, even by the most scientific research; and the different processes which constitute vegetation, by the various modifications of the sap in its ascent and descent, not having been explained with sufficient degrees of accuracy; and the chemical analysis of vegetables being considered by physiologists as very imperfectly understood; it must follow, that the most simple and obvious operations of nature are still, in a great measure, involved in obscurity. With very limited powers, therefore, the naturalist enters on the task, either of ascertaining the germinating or the vegetative principle of plants; of tracing their growth, and their arrival at maturity, their diseases, old age, and decay; and the final termination of their existence.

* Organic substances, as soon as they are deprived of vitality, begin to pass through a series of changes, which ends in their complete destruction, in the entire separation and dissipation of the parts.—*Sir H. Davey, Elements of Agric. Chem. Lect.* 1. *page* 16.

Since, therefore, the invisible agency of nature, by which all her operations are conducted, cannot be satisfactorily explained, we must have recourse to the visible and proximate effect to discover the remote and distant cause; and here the greatest nicety is to be observed, to distinguish between cause and effect; to keep our judgment unbiassed by wild theories or favourite systems, such as are neither compatible with the sober and uniform appearance of nature, or the deductions of rational enquiry.

Every species of the vegetable, as well as of the animal, creation has its different periods and stages of life; its youth and old age, its health and sickness, its time of maturity, and its time of dissolution.

It will greatly facilitate and illustrate the present enquiry, the object of which is to ascertain in what manner the plant of wheat becomes infected with disease, having a reference also to its prevention; to enter into a previous investigation of,

1st, The Constituent Parts of a Grain of Wheat.
2dly, The Botanical Structure of the plant.
3dly, Its Chemical Composition; and,
4thly, The Nature of its Decay.

After which will follow, in a natural course, the consideration of those disorders which destroy or contaminate, either the nutritive or

germinating property of the plant; and by rendering it unfit for performing its secretions and functions, (being itself, at the same time, incapable of renewal or reparation by any of the physical powers possessed by the vegetative principle of an annual plant,) ultimately terminate its dissolution.

On the Constituent Parts of a Grain of Wheat.

It will be necessary to determine the constituent parts of the grain, because not only its well-being, but even its existence, depends on the order and properly balanced distribution of its component parts.

A grain of wheat is found, by analysis, to contain a certain quantity of gluten, of starch, of fixed oil, and of carbon, in unequal proportions. The office of the two latter ingredients seems to be to preserve it in its state of seed from corruption; to repel the introduction of moisture; and to enable it to retain, for any length of time, the germinating power: as the office of the two former substances (not taking into consideration the wholesome and ample provision it affords to mankind by its different condiments, for which it seems by Providence to have been primarily designed) appears to be to support and nourish the nascent plant in its first stages

of vegetation: and the greater quantity of flower is contained in the grain, the more nutriment will the plant receive, and in a more regular and constant succession; at the same time, should any of the constituents of the flower itself become contaminated, the disease will be found to infect the future product; but this will be discussed in the progressive state of this enquiry.

On the Botanical Structure of the Stem of Wheat.

The vegetable structure of all plants is formed by a number of cylinders placed one within another; each of which appears, by a beautiful symmetry, to have a separate and determinate use; and by this admirable construction, their vessels, when in a perfect state, can never interfere or clash with each other's functions.

The *stem* itself is usually divided into four or five *reeds*,* or *canes*, by as many *joints* or *bands*; and these are peculiar to the gramineous tribe. When the leading shoot arrives at a

* The term *reed* may be appropriated to that species of wheat which has a hollow stem; and the term *cane* to the *cone* wheat, (probably at first called *cane* wheat,) which is of a solid contexture. It is remarkable that, in the year 1813, the wheat in every field which the author examined, had only four joints; and in the year 1814, it almost as invariably had five.

proper age, it assumes a different formation, having its summit (*apex*) terminated in a spike, bearing a cluster of flowers, in the capsule or seed-vessel of each of which are situated the rudiments of the future grain; the plant itself, from having been in its first state of existence gramineous now becomes culmiferous, and seems to require a different, and perhaps a stronger, sort of food, assimilated and adapted to its wants in this advanced period of life; and the sap vessels no longer act by extension and elongation of its parts, but are directed through proper channels to form and nourish the flower, and mature the seed.

The joints contain all the vessels, and various members, both of the *reed* and *glume*, in a double series, which may easily be discovered by a cross section through any of the joints; the inner series belonging to the *reed*, and the outer series to the *glume*: the *leaf* properly belongs to the plant in its gramineous, the *glume* in its culmiferous state.

It is observable that the *Rust*, from whatever cause it proceeds, makes its first appearance on the reed just above and below the uppermost joint, and on its corresponding glume, issuing from the base of the joint; these parts of the plant having a mutual connexion or dependence on each other. The joint itself also partakes of the same malady, and in a short time becomes so

distempered and deranged, as to be unable to transmit the accustomed juices, or to perform any of its usual functions; the lower divisions afterwards become infected in succession, till at last the disorder descends to the root: whilst the communication is open between the root and the ear, the grain continues to be enlarged; but when any obstruction takes place, no more nourishment can be conveyed: the germ, indeed, is formed, in the first instance, in the grain; but the farinaceous substance destined for its future support is defective; and the vegetative power of the plant being no longer able to assist the process of nature in reaching a higher state of perfection, immediately becomes subject to premature decay.

It is material to pay great attention to this part of the structure of the plant, since the rust invariably makes its first appearance at this particular place: but this will become the subject of future references.

The exterior cylinder of the stem of wheat consists of a cuticle, having a smooth and polished surface, of a hard siliceous quality, being considered the chief support and stay of the plant: whilst this is in a perfect and healthy state, it seems sufficiently enabled, by its superior hardness, to resist the attack of the fungus, or of any other parasitic plant; and the interior cylinders being distended with their

own mucilage must bid defiance to the introduction of any foreign substance.

Beneath the cuticle is a range of cylindrical vessels, constituting a *vascular* series, in which the *sap vessels* secrete and deposit the extractive and mucilaginous matter peculiar to the plant; the *air vessels*, at the same time, in their due arrangement and order, performing their own functions, and regulating their own system. But should the cuticle which confines the solid substances, by any event become lacerated, a portion of them immediately escapes through the lateral fissure, and fixing itself on the outside of the stem, becomes a nidus for its own appropriate species of fungus. The centre of the stem (except in the cone variety, which is furnished with a solid pith) is hollow, and the air confined within its recess may serve a double purpose, both to distribute a sufficient allotment of air to the plant from within, and also to keep the reed sufficiently distended, and prevent its collapsing from the pressure of the atmosphere from without. Vitiated air, no less than vitiated food, being absorbed into the habit of the plant may have great influence on its future state of health. There are also many other vessels, adapted to various instrumental uses, and one superior to the rest, common to all plants, in which their vital principle is thought to consist,

called by some the *corona*, by others the *circle of life*, the *line of life*, and other denominations: but since the great and inveterate disorders incident to corn, do not seem to originate in these finer vessels, they will not become the subject of further notice or enquiry.

The blossoming of Lammas wheat generally begins about the middle of June: at this season the plants put forth an additional set of roots, which may be deemed an effort of nature to replace those which have been broken or injured by the severity of the winter; or, to be enabled to search for a greater quantity of nourishment at this time of imperious necessity, when the fructification commences; and particularly for those oleagenous juices, which are requisite to fill and nourish the grain, and preserve it afterwards from decay. And if, at this season, a sufficient quantity of wholesome food is not supplied, a foundation is laid for those disorders which injure or destroy the future crop, and disappoint the hopes of the husbandman.

On the Chemical Composition of the Plant and Grain of Wheat.

The *chemical* ingredients both of the plant and grain of wheat are found, by the analysis of modern chemists, to consist of oxygen, hydrogen, and carbon, in determinate propor-

tions. Water and atmospheric air are the chief vehicles which transmit these substances, as well as all other kinds of food and nourishment, to the supply of the wants of the plant; and these constituent principles, being introduced at first in a separate form, are only *mechanically* mixed, but afterwards, by the action of the vegetable process, they become *chemically* combined; and having entered the channels of the plant as food, they are afterwards converted into its essential substance; and from being vaguely diffused, they become fixed and stationary. As long as the bond of union subsists between these constituent parts, vegetation and progressive growth mutually continue; but when, by accident or time, the connexion is dissolved, the chemical ingredients, separating from each other, become differently modified, or enter into new combinations incompatible with the life of the plant, which now gradually perishes: the grain also, partaking of the same component principles, submits in similar circumstances to the same imperative laws of nature.*

* The equilibrium which keeps the elements of plants united is so easily disturbed, and this perturbation is ordained in such a manner by nature; it enters so immediately into the plan of her economy; that it is the course which she causes the vegetable substances to take, in order to make them restore, in some measure, the portion of matter which she had lent for their organization, and return it to the common receptacle of its perpetual circulation and employment.—*Fourcroy's Chemistry, vol.* vii. *page* 77.

On the Decay of the Plant of Wheat.

The plant of wheat, being annual, as soon as it has ripened its seed, and performed the functions assigned to it by its vegetative principle, immediately begins to exhibit symptoms of old age and decay; the roots wither; the stem, deprived of its wonted substance, becomes weak and flaccid; the chemical decompositions, which take place, in consequence of their bond of union being dissolved, contribute to accelerate its final extinction, and to resolve it into its elementary particles. The air-vessels (no longer a distinct series) become confounded with the sap-vessels, and the barriers between them are broken down and demolished. The ultimate effort of the plant is to perfect its seed for the reproduction of its own species; and when that office is completed, there is no longer any possibility of continuing its life; the exhausted sap cannot be replenished; the parenchymatous and mucilaginous matter is withdrawn; and the *rust* announces a decomposition of its integral parts. The interior cells and tubes of the vascular system are now invaded by the insinuation of the fungus; which is not, in this instance, as commonly represented, a parasitic plant, but the genuine assistant and handmaid of nature: and is also, by the peculiar law of its own proper vegetable energy, as invariable and constant an

attendant on the stem and glumes of the plant, in its progress towards decay, whether this decay may happen before or after the maturation of the seed, as the pollen of the stamina is on the grain in its advancement towards maturity. Neither the fungus nor the pollen is an original constituent part of the plant, yet they exist in its habit, and in a certain stage of life, at the call of nature, they make their destined appearance, and each, in its turn, performs its proper function: but their offices are widely different; the one, (the pollen,) proceeding from the vigour of health, is the increment of fecundity; the other, (the fungus,) arising from the infirmity of disease, is the harbinger of death.

These preliminary observations having been made, and the *Botanical Structure* and *Chemical Composition* of the plant of wheat having been examined and described, according to the most popular systems of modern physiologists; the developement of the causes of the diseases to which it is liable, and the best practical means of guarding against them, according to the author's theory, will now be more efficiently detailed, and more readily understood; it being scarcely possible to account for the disorders of plants, without a previous examination of them in their state of health; a deviation from which constitutes disease.

On the Diseases of the Plant of Wheat.

It is with some difficulty the Essayist enters on the task of describing the different diseases of corn, when agriculturists themselves are not agreed about the appropriation of the terms by which they may be distinguished. *Blight*, *Rust*, and *Mildew*, seem to be used by them indiscriminately; thus what is called *Blight* in one county, is called *Rust* in another, and *Mildew* in a third.

Every disorder to which standing corn is liable may, in the general and unlimited acceptation of the term, be denominated a *blight*: and whatever injury it receives, either in the root, stem, or ear, may equally be said to affect it with *blight*. This, therefore, appears to be too general a term to denote any specific disorder.*

Blight, in its comprehensive sense, may be divided into three separate and distinct disorders —the *Rust*, the *Mildew*, and the *Collibrand*, or *Smut*, each of which will be considered in succession, in the progress of this essay: and these disorders will be classed in two grand divisions;

* The same confusion also obtains in the *Latin* terms, the proper signification or application of which has not been accurately defined by grammarians. In the works of the *Scriptores de Re Rustica*, the verbal term *rubigo* seems to denote what is commonly called *rust*; and *uredo*, in a more general sense, is applied to *blight*, whether occasioned by heat or cold: but these, and all the other *Latin* words relating to the diseases of corn, seem to be used very arbitrarily, and not settled by any authority or nomenclature.

the *Rust* and the *Mildew*, affecting the *botanical* structure of the stem, and its appendages; and the *Collibrand* affecting the *chemical* composition of the grain.

On the Rust of Wheat.

The *Rust* is, by the latest publications of the botanical writers of the present day exclusively reputed to be *occasioned by the growth of a minute parasitic fungus or mushroom on the leaves, stems, and glumes of the living plant.*† The practical farmer as invariably assigns it to the malignant effects of morning fogs, or, in other words, to atmospherical influence: and the ancients, as recorded by Pliny, ascribed it to the controuling power of the moon. But the writer of this essay, founding his opinion on various researches and observations, attributes it to *spontaneous decay*. It is an unquestionable fact, that the Rust has made more considerable ravages within the last ten or twelve years, than in those immediately preceding: to what cause is this to be ascribed? To the greater abundance of the prolific fungus? To the prevalence

† See a short account of the cause of the disease in corn, by *Sir Joseph Banks, bart.* This account seems to have originated, as quoted, from the observations of *Felice Fontana*, published at Lucca, 1767. Dr. Thompson, in his System of Chemistry, and Sir H. Davy, in his Elements of Agricultural Chemistry, relying, perhaps, implicitly on the great authority of the President of the Royal Society, have attributed the disease in question to the same cause.

of more ungenial seasons? Or, is it not more likely to proceed from the avidity of the farmer, who, from the high price of corn, has been tempted to exhaust his soil by too quick a succession of crops, and to have tilled his land without sufficient rest, or without due preparation.

The *Rust* of the wheat plant, as being indicative of its decay, which may be considered as the groundwork of the theory endeavoured to be supported in the following pages, may be ascribed to every *cause* that may operate to prevent its arriving at its due perfection; and the grand preventive of the deleterious effects of rust must eventually depend upon proper culture; that culture, which, not being defeated by negligence, ignorance, or injudicious practice, flourishes under the guidance of industry, skill, and scientific management. Disease, originating from the sourse of ill conduct, is, perhaps, the only malady incident to the cultivation of grain, which admits of no modification—no controuling palliative.

No general practical means of prevention, applicable to all cases is here presumed to be recommended for adoption; yet still it may be asserted, that every specific cause of disease will admit of its own specific mode of prevention. Much depends on the nature, the situation, and the com

position, both of the soil, and the subsoil; and the same treatment which may be beneficial in some circumstances, may be injurious in others: no one definite mode of practice, therefore, can be adopted. By way of illustration, some causes amongst a variety of others, may be enumerated, liable to produce the rust; and the most obvious means of prevention may be pointed out: thus, for instance, if the disorder be likely to proceed from too thick an assemblage of plants, the specific remedy will be to hoe them, or by any means to thin them: if, from being too thinly scattered, to transplant or to give them a top dressing, enabling them to produce more offsets, or, in the agricultural phrase, to make them tiller. The specific remedy, as applicable to one of these cases, would have a directly contrary effect, if applied to the other; for no one would think of removing plants from the spot where they were too thin; nor of giving a top dressing to plants already too luxuriant. Culmiferous plants will not thrive when too closely crowded, nor when too widely separated; if they grow too close, they will annoy and starve each other; and if at too great a distance, they will pine and die: they require a free access and circulation of air to nourish and brace their solid contents, and to carry off their perspirable secretions; at the same time they are

unable to bear a pernicious exposure to the scorching rays of the sun; they flourish only under the fostering shade of their protecting neighbours, removed to a proper distance. No certain application, therefore, can ever be made, to suit a variety of cases, so independent on each other; nor can they be reduced to any regular system. Suppose, again, the ground to be full of rocks; the remedy is to remove the stony masses, or to provide a greater depth of soil. The disorder, in this instance, originates from too thin a stratum of earth being placed upon a solid substance, causing too quick an evaporation of moisture, and a consequent deficiency in the supply of proper food. An undue retention of moisture will be equally injurious, and this is to be corrected only by draining. If shade predominate, remove the tree or other obnoxious cause; either make the sacrifice, or submit, without repining, to the inconvenience. The disease in question may also arise from excess of stature,* or from exhaustion of soil;—from undue preparation, or, what is equally or more detrimental, an improper time of sowing; it being an adage with the farmer, that it is

* There is a certain height to which the soil ought to raise the ears of corn: when, from any cause, they are elevated beyond that pitch, the real nourishment that should go to the grain is spent upon the straw.—*Dr. A. Hunter's Georg. Ess. vol.* i. *page* 91.

better to sow out of temper than out of season;—from a deficiency or redundancy of manure; the one being devoid of the necessary stimulus, the other possessing it in too preponderant a degree; too rapid a growth of vegetables generally producing an equally rapid decay;—from an understratum of viscous or ochrous clay, or of siliceous sand, which operate prejudicially, as the season proves wet or dry;—from mineral salts or acids below the surface, or from exhalations or vitiated air above it;—from mutilation, or any other defect;—from internal weakness, or external accident;—indeed almost every arable farmer can swell the catalogue by some peculiarity in his own soil; and the best specific remedy or preventive must generally be sought for by him in his own mode of practice. But seizing every opportunity of improving his knowledge, and noting all occurrences as they arrise, and comparing the results of his observations as well on his own method of cultivation as on that of his neighbour; he will foresee what obstructions are to be removed, and what deficiencies to be supplied: and if he find his own fields more subject to rust than those of an adjoining district, he should carefully analyse his soil, and endeavour to discover the latent cause of failure; and by these means, being made better acquainted with the temperament of his

land, he will abate the noxious tendency of one substance, by the substitution of another of an opposite quality, and trusting to that peculiar management to be derived only from prudent foresight, diligent attention, and decisive experience, he will be sufficiently enabled to guard against the barrenness of poverty, and the corruption of disease; nor need he be apprehensive of any deficiency in his expected crops, or disappointment in the enviable store of his well-earned annual returns.*

This disorder most commonly originates from some derangement in the sap-vessels, or the air-vessels; and naturalists are well agreed, that the cibarious and pneumatic systems mutually assist and invigorate each other; and that any defect in one immediately proves the certain destruction of the other. And it is more than probable, that if the malady could be traced in all its bearings, and all its intermediate stages, to its original source, it would be found to have made some secret progress, long before its actual appearance was indicated by any ostensible symptom.

A great analogy subsists, in various ways, between plants and animals; and it is found much

* As plants are capable of amelioration by peculiar methods of cultivation, and of having the natural term of their duration extended; so, in conformity to the general law of change, they are rendered unhealthy by being exposed to peculiar unfavourable circumstances; and liable to premature old age and decay.—*Sir H. Davey, Lect. on Agric. Chem. page* 226, 4to.

more easy to keep each in health, when in a state of convalescence, than to restore either to a sound constitution, when weakened and contaminated by disease.

It is asserted by chemists, that every process of nature in the vegetable kingdom may be referred to some chemical operation. The watery juices which enter the plant by the roots are fraught with all the ingredients necessary to its growth and formation, and being only *mechanically* mixed, (each particular substance being in its pure and free state,) they constitute what is called the *Common Sap.* These juices, by the action of light and heat, and other controuling powers of nature, undergo various changes, in appropriate vessels, adapted to their own peculiar uses: and, by certain regulated and determinate processes, they become *chemically* combined, and form an inspissated juice, called the *Proper Sap:* and every species of plant has the faculty of modifying and applying its own peculiar or *proper* sap. This inspissated juice, being deposited in its proper receptacles, becomes unelastic and fixed, and forms the solid contents of every plant; but when the plant has, in its time and season, performed all the operations assigned to it by nature, or has endeavoured to perform them without success, it tends immediately to decay: and the reverse of all these agencies immedi-

ately begins to take place, and a general decomposition ensues; the constituent parts, from being *fixed*, become resolved, elastic, and relaxed; the *solid* contents lose their bond of union, and are no longer *chemically* combined, but revert again to their original *mechanical* mixture; the gaseous and watery fluids are dissipated in the atmosphere; whilst the more solid masses fall to the earth, there to undergo a more gradual, though no less certain, decomposition.

Animal life seems to be governed by the same laws; and by adverting to this simple yet uniform process of nature, many of the phenomena, both of the animal and vegetable economy, may be plainly demonstrated, without having recourse to the unsatisfactory and fallacious expediency of second causes.

The stem of wheat within the cuticle is composed of a vascular series of longitudinal cells, their sides and ends being terminated by woody fibre. When decay begins to take place, the solids contained within these cells are gradually decomposed; the aërated gases are set free, and being too powerful, from their elasticity, to be confined within such narrow limits by such frail materials, they rupture the cuticle of the reed in longitudinal fissures, relatively equal to the length of the cells, and, making their escape through the orifice, mix again with their kindred atsmospherical fluids.

At the same time the more solid contents of the pulp exude through the lacerated fissure, and, being deprived of the living principle, form an inert mass on the outside of the stem; and in like manner as the inferior metals, exposed to the action of the air, become corroded, and their outer surface is converted into an oxide, and are about to undergo a change from their metallic to their mineral state, reverting again to their original earthy form; so the pulpy, the mucilaginous, or parenchymatous substance of the plant, by being exposed to the air, on the outside of the cuticle of the reed, undergoes also a state of corrosion; its outer surface becomes coated with what may not inaptly be termed a vegetable oxide or rust; and being constantly acted upon by the destructive principle of nature, it is by degrees converted into mould, and returns again to its primitive earth. At first, the exudation is of a pale yellow, and the tint is not unlike that of the falling leaf; it soon turns to a dark brown, nearly approaching to black; imitating the leaf also, (being governed by the same laws,) in this its more advanced stage of decay; and at length it becomes entirely decomposed.

The *Rust* appears at first as a small discoloured speck or point; it soon progressively extends itself into a continued line, yet still within the cuticle, corresponding with the length of the cell

in which it originates, and in which the decomposition of the chemical properties of the plant commences. In this state it may be called *Incipient Rust:* whilst this is confined *within the cuticle*, the plant is competent to perform all its offices, still retaining the living principle; but if the cuticle is burst asunder, and the solid contents are protruded through the orifice, forming an excrescence on the *outside of the cuticle*, the disease may then be termed *Inveterate Rust;* the plant can no longer execute its functions, and the spark of life gradually becomes extinct; and the grain, from this time, is found, by actual observation, rather to diminish in size than to increase:* in this event the sickle cannot be applied too early.

* Specimens of the constricted grain, as well as of the Rust on the straw in all its stages, were collected, numbered, and labelled by the author, and are herewith sent for the inspection of the Society.

In the month of July 1814, he was at Exmouth, and hearing of a field much affected with Rust in the parish of Lympston, he frequently went to view it; the farmer of the premises told him, that it was first observed on the 9th of July, when it was of a light brown colour, but general throughout the whole field. The author saw it first on the 23d of July, a fortnight after, when it was of a much darker colour; some grains were then rubbed out. On the 30th of July it was reaped, and placed in shocks to harden in a neighbouring field; some more grains were then taken promiscuously as before, but they were evidently lighter and smaller than those obtained in the preceding week; the sheaves remained on the ground for a month, when they were carried to the barn, and by the recommendation of some of his neighbours, on grounds not yet sufficiently warranted by experience, threshed out for seed!! The field itself is about four or five acres, gently sloping towards

It is proper, also, to notice the time of the appearance of this disorder, which, if premature, invariably happens between the impregnation and the ripening of the seed: if it occur in the early part of the season, before the milky juices are hardened into a farinaceous substance, the crop is entirely lost; if at a later period, it will be partially affected, according to the advancement of the grain towards maturity: the greatest attention, therefore, of the farmer, should be directed to provide against any contingency which may happen at this interesting period, when the fruit of his labours depends on his own discretion, and the reward of the year so much on his own exertions.

On the Mildew of Wheat.

The *Mildew*, as contradistinguised from *Rust*, may not improperly be applied, as the name seems to import, to that saccharine and moist *Bloom*,* or

the south; it was sown with the common white Lammas wheat, the annual rent and other charges about four pounds or guineas per acre.—It was not manured for the wheat, but in the former year it was cropped with potatoes, and the manure was one hundred seam, (*i. e.* horse-loads) per acre of rotten dung. It is to be remarked, that this parish is very subject to the Rust; and the usual preparation for wheat is lime and dung alternately, every fifth, sixth, or seventh year.

* See Observations relating to the blight of corn, by G. Cumberland, esq.—*Nich. Jour. vol. xii.*

Mould,* which appears on the reed under the glume, and on the corresponding joint of infected wheat. It may easily be displaced by the finger, though it soon forms again after being removed. This disorder does not make a separate advance with, nor does it always accompany, the *Rust*; but its concurrent attacks are discovered in rainy seasons, and in deep ravines of humid situations, when a destructive quantity of moisture in excess is absorbed; and in elevated regions, where the frequent condensation of vapour occasions a humid and low temperature. The Bloom as well as Rust is classed and described in the publications of the Linnæan Society, as a species of fungus.† Being in a great measure incorporated with rust, no further notice need be taken of it as a separate disorder.

This theory of the nature of Rust must be considered as militating against many pre-conceived opinions, sanctioned by high authority:

* The term "*Mildew*" should rather be exclusively applied to plants which have the principle of life in them; and the term "*Mould*, or *Mouldiness*," to plants and seeds, when life is extinct. Thus a cargo of wheat, when it takes wet on board of a ship, ferments, loses its germinating quality, and becomes *mouldy*, but we do not say it is *mildewed*.

† The light-coloured substance which appears on the stalks and leaves of late-sown garden pease, and on the seedling plants of the white thorn, when they stand too thick in the seed-bed, or when removed from a richer to a poorer soil, or to a more exposed situation, assumes a similar fungus-like appearance, and is "*a Mildew*," of the same precise description.

The author, therefore, does not expect that every person should, at the first glance, become a convert to his sentiments, without due conviction; he has not suffered his own judgment to be biassed by the theoretical statements of others, but has himself made a practical investigation of the subject of his enquiry; he has taken the liberty to think for himself, and allows the same privilege to others. It may, indeed, take a series of years to prove the truth or fallacy of his positions: but such as they are, he submits them with deference to the notice of the Society, not as accepted and decided truths, but as problems which require a more protracted and inquisitive investigation. The disorder has obtained a place upon record, (as the motto imports,) at least from the days of Pliny; and whilst the land is cultivated by persons who depend more upon chance for their crops of corn, than on judicious management, it will, in all probability, continue till the end of time.

The following positions will comprehend the whole of the author's general conclusions on the first class of the diseases incident to the plant of wheat, depending upon its *botanical* structure.

First, that the *primary, remote,* or *distant* cause of the diseases of wheat terminating in *rust,* appears to be, the *cessation* or *suspension* of that active vital principle which is necessary to

support the growth of the plant, and to promote its ultimate progress towards maturity.

Secondly, that the *proximate* or *immediate* cause of the actual presence of Rust appears to be that invariable and spontaneous effort of nature to decompose, and resolve into its elementary principles, that plant, which, by the full *extinction* or partial *remission* of the vital principle, whether occasioned by internal defect or external accident, does not possess the power and ability to reach its utmost destined perfection; which is that of ripening its seed, and consequently of continuing its own species.

Thirdly, that the *fungus* appears to be the universal attendant on the last stage of mucilaginous decomposition or putrefaction, and the immediate symptom of speedy dissolution.

On the Collibrand, or Smut of Wheat.

The other class of disorders incident to wheat, and to which allusion was made before, affects the *Chemical* Constitution of the grain. The chief of these, as well as the *Rust*, has also various appellations, being indifferently called *Smut*, *Pepperbrand*, *Coalbrand*, and other names, and in the west of England *Collibrand*; this remains now to be considered, and will be attempted to be explained on the principles of

agricultural chemistry. This disorder appears in the shape of a dark brown powder, sometimes placed loosely on the spike of the ear, without any capsule, and at other times contained within a capsule: when the spike emerges from its sheath without a capsule, this dust is dissipated by the wind and rain, almost as soon as it appears, and does not create much mischief:* at other times it is seated within a capsule, having a bloated appearance, and is found to contain, instead of a nutritious substance, an unwholesome granulated mass, not only debasing the quality of the flower, but communicating its contagious effects to the germ, and by its baneful influence contaminating the succeeding crop. An accurate analysis of the infected grain having been made by some eminent French chemists,† their report of it is subjoined in the note below.

* The ear being imperfectly formed, and having no leading awns at its apex, enabling it to perforate the folded integument of the neck or ring of its sheath, is generally protruded sideways, and by having been too long compressed when in a growing state, becomes crooked in its shank.—*See Dr. Hunter's plates, Georg. Ess.* vol. iii. p. 372.

† *On the Chemical Nature of the Smut in Wheat, by Messrs.* FOURCROY *and* VAUQUELIN.—The *Smut* is a corruption of the grain, which exhibits within the husk of the seed, instead of a farinaceous substance, a black, greasy, stinking powder; the most decided and dangerous characteristic is its being capable of infecting other grains by contact, and imparting to them the property of propagating smutty wheat.

The very luminous exposition of the chemical nature of the *smut* in wheat, and its correct analysis detailed in the note, may serve as the basis of an investigation into the nature of its cause,

Its Component Parts.—The *Smut* of wheat by analysis contains, 1. A green, butyraceous, fetid, and acrid oil, soluble in hot alcohol or ether, composing near one-third of its weight, and imparting to it its greasy consistence.

2. A vegeto-animal substance, soluble in water, insoluble in alcohol, and precipitating most of the metallic salts as well as galls; it composes rather less than one-fourth of the smut, and is perfectly similar to what comes from putrified gluten.

3. A coal amounting to one-fifth of its quantity, which gives a black colour to the whole mass, and is an evidence, as it is the product, of a putrid decomposition; a part which it acts equally in mould, and in all the remnants of putrified organic compounds.

4. Free phosphoric acid, scarcely constituting more than 004 of the smut, but sufficient to impart to it the property of reddening the vegetable colour.

5. Lastly, the phosphates of ammonia, magnesia, and lime, in the proportion of a few thousandths only.

The smut of wheat, then, is nothing more than a residuum of the putrified grain, which, instead of its original component parts, starch, gluten, and saccharine matter, exhibits only a kind of carbonaceous oily substance, very analogous to a kind of bitumen of animal or vegeto-animal origin. Putrified gluten exhibits similar results. The nature of its cause and of its contagious quality, is not known; but it is natural to presume, it arises from putrid decomposition; which may proceed from any other circumstance, as well as a communicated germ.

The same results equally lead us to infer, that the putrescency which necessarily precedes the formation of *Smut* in all cases, whether it depend on contagion, or arise spontaneously, attacks particularly the gluten, and precedes, indeed prevents, the formation of the starch; since we know positively that this fecula, no traces of which are found in the *smut* of wheat, suffers no alteration from that septic process which so powerfully attacks the glutinous substance.—*Nicholson's Journal, No.* 102, *vol.* viii

and of its contagious quality, and of preventing the baneful and frequent occurrence of the disease.

Various opinions have been formed relative to its origin: one person ascribes it to the injury done to the roots, by worms and grubs;—another to the constriction the plant sometimes experiences, on its coming into ear;—and a third to the agency of a very small fungus, which fixes on the grain;—and others to the presence of animalculæ, &c.—but it can rationally be accounted for only on the principles of agricultural chemistry, that is, by decomposition, and a consequent tendency to putrescence, originating from a corrupted source. The small globules of the *Collibrand* itself are, by some writers of eminence* on botanical subjects, supposed to be the seeds of a species of fungus; but since they exhibit no symptoms of the living principle, and do not, like the seeds of all other organised vegetables, expand themselves by heat and moisture,† or in any degree alter their temperament or figure; neither producing a nascent plume or a nascent radicle: they can be viewed in no other light than, in conformity with the

* The Rev. Wm. Kirby.—*Nich. Journal.*

† All seeds contain within their membranes a certain medullary substance, which swells, when dipped into warm water.—*Dr. Hunter's Georg. Ess. vol.* iii. *Essay* ix. *by Linneus, page* 124.

above-recited analysis, as a putrid substance verging towards decay.

The seed-vessel affected by the *Collibrand* appears to contain a portion of *gluten*, *oil*, and *carbon*, sufficient to form and fill the grain, but to be destitute of its portion of *starch*, which constitutes an equally necessary and grand component principle of organization. In consequence of this imperfection, the elementary ingredients, requisite for the formation of the grain, cannot coalesce, or enter into any state of union or chemical combination; neither can the germ, the embryo of the future plant, be formed or the generative system become perfect; the deficiency of any one ingredient, or the redundancy of any other, prevents that combination or saturation necessary to harmonize the parts, and the whole becomes an inert mass, without any vital principle. The more light, elastic, or gaseous particles leave the seed-vessel, and unite with other substances of affinity dispersed throughout the body of the plant; whilst the more solid contents, the gluten, oil, and carbon, not being capable of a similar absorption, remain behind, and evince a disposition to run into a putrescent state; but the presence of the essential oil prevents the absolute putridity of the gluten: these grosser particles, confined within the capsule of the grain, and consisting of

putrified gluten and an excess of carbon, assume the colour and consistence of a black powder, the aggregational volume of which is continually enlarged by the regular supply of food, elaborated through the proper channels, till the capsule assumes a distended and bloated appearance. And it is not improbable, but that the oxygen, (being found to possess the quality of imparting to vegetables their green colour,) having been diverted into other channels, and dispersed through the body of the plant, may give it a deeper green or porraceous tint, easily to be distinguished even before the spike of the ear issues forth from its vaginal integument.

It has been proved by experiment, that the putrid gluten of the Collibrand is exactly similar to the gluten of sound corn, when suffered to putrify: from hence, as well as from many other causes, may be inferred, that the disorder is not so likely to be occasioned by worms, by animalculæ, or by the fungus, as by the contaminating principle of the putrid oily gluten affecting the chemical composition of the grain. The disease is not supposed to arise from any original defect in the formation of the germ, but from the extraneous substance of the putrid powder insinuating itself, if not prevented, into the organic frame and constitution of the plant in its nascent state; retaining and communicating its noxious

qualities, and extending its deleterious influence both to the present and the future produce; and the infected seed, unless assisted by some means of prevention, will produce a vitiated crop. The practical farmer, therefore, has recourse to some mode of preparation, especially if he has reason to suspect the soundness of his grain, to counteract the infection of the disease; which is either by simple washing, by brining, or by liming. Simple washing, if it could effectually remove every particle of powder, which, from its oily quality, is very tenacious of its hold; might have the desired effect; but it would be difficult to dislodge it from the deeply-furrowed channel almost intersecting the grain, and also from the indented cavity surrounding the germ. This remedy, therefore, is not implicitly to be depended on. Steeping, also, in various menstruums, has been tried, both to assist the germinating power, as well as to obviate the noxious infection, but it has not been attended with the expected success: neither is there any decisive experiment to prove that any preventive of the contagion has attended the use of brining.* It may, indeed, be of some service to separate the

* Brining of the seed-wheat is what the farmers generally practise to prevent the *Smut*, which in most years answers very well: but there is nothing which contributes more to this, than keeping the plants in good health.—*Miller's Gard. Dict. art. Triticum.*

lighter from the heavier grains: but since, from its antiseptic quality, it impedes the putrefactive process, and resists decomposition, (the contrary of which is ascribed to the effects of lime,) it cannot be presumed to be of much efficient service. The only approved and established remedy hitherto discovered is by liming: lime has the property of defeating the action of the morbid particles of the Collibrand, by accelerating their putrefaction; it separates the oil from the putrid matter, destroying the old combinations, and forming new ones: it therefore affords the best physical cause to account for the suppression or abatement of the disease.

The effect of quick-lime, or of lime newly slacked, called hydrate of lime, on the *acrid oil*, the first examined substance of the analysis, is to change its very nature and consistence, and with it to form new combinations, which, in their turn, are also decomposed.* The particles of oil being attenuated are rendered capable of being mixed with water, and consequently of ascending the vessels of plants; and thus a noxious poison is converted into a wholesome nutriment.†

* Lime forms a kind of insoluble soap with oily matters, and then gradually decomposes them, by separating from them oxygen and carbon.—*Sir H. Davey's Lect. 4to. p. 279.*

† Lime acts as a manure in various ways: it attracts all the oils dispersed in the soil, and it dissolves all the mucilaginous fibres of plants; and by decomposing both the oily and fibrous matter, it

The next substance described in the analysis, which arrests our attention, is the *putrid gluten*. The action of lime on this, as well as on all corrupted matter, whether of vegetable, of animal, or of vegeto-animal origin, is, by accelerating the putrefactive process, to resolve the constituent ingredients of all bodies into their elementary particles; and thus becoming again simple substances, they adapt themselves to new organizations, and possess no inherent deleterious quality.

renders them subservient to the immediate purposes of vegetation. It destroys all the worms and grubs with which it comes in contact: it also gains from the atmosphere as much in weight of carbon, (which is now generally esteemed the basis of the nutriment of plants,) as it has lost of it by torrefaction: its calcareous substance also becomes not only the food, but a part of the genuine substance, of the plant itself: it opens the soil, and is conducive to many other uses. And since it acts chiefly by the decomposition of oily and mucilaginous substances, it follows, that such a quantity only should be used as is sufficient for these purposes; and that if twenty or forty bushels per acre is sufficient, the spreading of one hundred in such circumstances would be attended with no greater beneficial effect. It follows, also, that a less quantity will suffice for poor land, (which does not so much abound with oily particles,) than for that which is richer, where they are more abundant.

It is in all respects a very powerful manure; but it is found to force and exhaust the land, and by frequent application greatly to impoverish it: the land, therefore, on which lime is used, should frequently be replenished with some rich and fat manure. When the lime has lost its stimulating power, and becomes effete, which happens in a lapse of two or three years, it falls in ploughing, like the spent ashes of a pared and burnt soil, to the bottom of the furrow, and, equally with the ashes, becomes an heavy inert mass, totally useless and inefficacious, and unfit in future to give any subsequent assistance to vegetable production.

The third substance exhibited by the analysis is the *coally matter:* this seems to be the gross carbonic residuum, common to all putrid decomposition; and either as mould, or as simple carbon, is still an instrument in the hand of nature to renovate and perpetuate the beauty and harmony of all her works.

The other constituents of the *Collibrand,* being in very small quantities, are to be considered as products of the soil, or of some of the pre-existing and more abundant ingredients. The disease of the *Collibrand,* therefore, may generally be supposed to originate from an infected germ; the obnoxious powder is not imagined to be internally mixed with the solid contents of the grain, but merely, by its greasy consistence, to adhere to the outward cuticle, and to be concealed amongst its capillary filaments, or in its deeply-channeled recesses: and unless it is displaced by some mechanical process, which is attended both with difficulty and uncertainty, or its energy defeated by the efficacy of some chemical solvent, the malignant powder mixes with the milky and saccharine juices of the cotyledon, at the time of the germination of the seed,* and is

* The farmers of certain districts in the hundred of Pydar, in the county of Cornwall, are so convinced that the Collibrand arises from infection alone, and are so certain that their crops of wheat intended for seed will be entirely free from it, entirely confiding in their own management and mode of culture, that it is not un-

absorbed into the habit of the plant, and ever afterwards has a preponderating influence over all its chemical changes; and, in the end, a fatal one on the formation of the seed.*

It has been observed before, that the *Rust* may attack corn when shaded by trees, when partially sown on rocky or shallow ground, when beaten down by rain, when injured by mutilation, and by various different means, whilst other parts of the crop in the same field are not affected by this local injury; from hence an inference may be drawn, that the disease is not, strictly speaking, contagious, nor to be indiscriminately dispersed abroad on all sides by the death-imparting influence of the fungus: on the contrary, the *Collibrand* is proved to be highly contagious, and, like the putrid disorders incident to animal life, susceptible of communication by contact, and producing irremediable dissolution.

common for them, before the season of blossoming commences, to offer, on the receipt of a guinea per acre, to forfeit the same sum for every head of Collibrand found in such acre. They grow their own seed-corn; their soil is a light one, on a stratum of slate or shelf, without the intervention of any particle of clay; their chief manure is calcareous sea-sand, and straw thrown in their lanes, and afterwards collected in heaps; and they medicate their seed by brining and liming. *Omnis in hac certam regio jacit arte salutem.*

* It might be amusing and instructive to endeavour, by a synthetical composition, to produce the Collibrand, by mixing some oily carbonaceous matter with the farina of the blossom before impregnation, such as the snuff of candle, various ink-powders, blacking-paste, soot, lamp-black, ivory-black, and the putrid gluten of wheat, or the black powder of the Collibrand itself,

The science of agriculture, though confessedly the most ancient, is allowed not to have kept equal pace with other sciences in progressive improvement. It is difficult to comprehend, even in the most limited degree, the botanical construction and the chemical composition of a plant, or the mode of its growth and decay; and equally so to ascertain the alternate decompositions and combinations of the oxygen, the hydrogen, and the carbon, the integral constituents of the vegetable fabric, as acted upon by the presence or absence of the matter of heat, of moisture, of light, and of electricity: But even the most partial examination, conducted without bias to any particular system, is calculated to illustrate, in some degree, the science of vegetation; which must ever remain but imperfectly understood, because depending upon so many chemical changes, continually acted upon by each other in a way which cannot be developed; so many complicated powers not capable of being divided by any correct line of separation; and, above all, by that invisible and inscrutable formation, which, by concealing the power of the *agent*, refuses to be submitted to the rules of actual demonstration. And every new discovery we make of the vegetable powers, serves only to point out to us, that others still lie concealed at such an inaccessible distance, as must ever elude

the keenest investigation of the most unwearied labour, and the most indefatigable research.

Specimens of the Rust of the plant of Wheat, both as it affects the grain and the straw, illustrative of the theory of the Essay.

(A.) Stalks of wheat, taken whilst growing from a field in the parish of Lympston, in the county of Devon, on the 23d July, 1814. The grains being very light, much shriveled, and containing very little flower.*—N. B. The parcel of grains, marked (*a*,) was taken from this sample. Some earth was taken up with the roots from different parts of the field, with a view to its being analyzed.

(B.) Stalks of wheat taken from the same field, when cut, on the 30th of July.—N. B. The parcel of grains, marked (*b*,) was taken from this sample. On examining each parcel, the grains separated from the stalks on the 23d July, were evidently fuller and heavier than those separated seven days after.

* Twenty-four of these grains of wheat, taken indiscriminately from the parcel separated on the 23d of July, the corn being then standing, weighed four grains Troy. And twenty-four of those separated on the 30th of July, the corn having been cut five or six days before, weighed only three grains Troy: the grains were whiter, and contained less moisture.

Specimens of Rust on the Stem of Wheat.

No. 1. A specimen of *Incipient Rust;* the disorder being confined to points and lines above the upper joint, without having pierced through the cuticle.

No. 2. *Rust* of a more decided character, and in a more advanced stage, having broke through the cuticle, above the upper joint, in longitudinal fissures; whilst Incipient Rust is observed in points and lines, of a lighter colour, both above and below the second joint.

No. 3. *Inveterate Rust,* both above and below the two uppermost joints; the decomposed solid contents being transmitted through the lacerated orifice, and fixed on the outside of the cuticle; the Incipient Rust making a slight appearance in the lower divisions, in discoloured points and lines within the cuticle.

No. 4. Six stems of wheat, issuing from the same root; five of them perfect in every respect; the sixth having lost its head, being affected with Rust; and the change is just taking place from Incipient to Decided Rust. The fungus does not yet appear, therefore in this instance it cannot be the cause of the Rust; neither can it be attributed to atmospherical influence, because the other stems are not infected: it is also evident from hence, that the disorder is not con-

tagious. The cause of Rust, in this instance, seems to arise from the single stem having been mutilated by accident, and deprived of its leading shoot; and not having within itself the physical power to supply another, it cannot, like the other stalks, continue its progress towards maturity, and of necessity it becomes subject to natural, although premature, decay.

Article IV.

Essay on the Commutation of Tithes.

To which was adjudged the Bedfordean Gold Medal.

[By John Benett, Esq; of Pyt House, Wilts.]

THE Bath and West of England Society, for the Encouragement of Agriculture, &c. having offered its most honourable reward for the best Treatise on a Commutation for Tithe, I hereby send it, the result of long reflection on that subject, though it has been very hastily written down. I have not been urged hereto so much by a desire to obtain that reward, as by a wish to promote the Society's

most laudable endeavours; feeling as I do, in common with it, that a commutation of tithe for some unobjectionable property would produce the greatest possible benefit to the agricultural interest of this country; and would, at the same time, strengthen the interests of its Church.

The late Mr. Pitt had it certainly in his contemplation to effect a commutation of tithe; his successors have been so much occupied with war measures, that all great national improvements and ameliorations have naturally been obstructed thereby.

The long wished-for time of peace is arrived, and has brought with it the expected good to all classes of the community, excepting to the agriculturist; to him it has brought evil.

The agriculture of this country is now on the decline; the present, therefore, is the time to remove one of the greatest checks to agricultural industry and improvement, which probably ever did exist in this or any other country, by a commutation of tithe.

In treating of tithe, I desire to be understood, that I do not, by any means, wish to invade the property of the church, or to doubt the perfect right and title which the clergy have to their portion of that property, as long as they perform the duties of the church. I speak of tithe as a property, (not considering in whose

possession it is,) which in its nature is so injurious to the interest of the whole state, that it ought to be, and eventually I believe must be, commuted for some other of equal value to the owners, but which will not produce the same evil consequences to the public.

The oppressive action of the tithe system has not yet been generally and perfectly understood. When tithe was first established, (and its advocates speak of it as of very great antiquity,) probably it was not worth more than one tenth of the *net* produce of the land. The earth, we must suppose, in those days, produced its fruits almost spontaneously, or with very little culture; but in the same proportion as the expense of cultivation has increased, so has the value of tithe increased beyond the *tenth;* for the tithe owner takes one tenth of the *gross* produce, without paying any part of the *expense* of *cultivation*. For this reason the *proportional* value of tithe to *rent*, in this country, has rapidly increased during the late war, or within these twenty years past. The expense of cultivation has been greatly increased by taxes, and various other causes; the increase of the expense of cultivation must either sink the rents, or raise the price of corn, for the farmer must have his fair profit. Now, if the rent should be sunk to repay the farmer's increased expense of cul-

tivation, the tithe will not be sunk thereby, for it is taken from the *gross* produce; consequently, the rent and tithe will come nearer in value to each other. The same will be the case, if the corn should be risen in price to repay the increased expense of cultivation, for the rent will not be risen thereby, though the tithe will. The consequence must always be, that all taxes or other expenses which may fall on the farmer, and which must tend either to depress or to prevent the rents from rising, (though the price of corn should rise,) will also tend to increase the value of the tithe; and though on account of the increase of our population, and the difficulties which have attended the importation of provisions, the rents have of late years risen very considerably, yet the value of the tithe has risen in a much greater proportion. The case must be the same with respect to all money expended in the improvement of land. I will suppose a farmer should expend five pounds per acre in lime, or any other artificial manure; the rent cannot therefore be raised; but the tithe must be worth, at the least, twelve shillings more; as six pounds worth more of corn must be grown in consequence of that manure, for the purpose of repaying to the farmer the original five pounds expended, the tithe amounting to twelve shillings, and interest of the money

five shillings, leaving to the farmer the profit of three shillings per acre for his exertions. The case is still stronger with respect to the cultivation of waste land, and almost amounts to a prohibition.

I will now consider tithe as it affects the Church alone, and the established religion of the country. It is an essential point for the support of religion, that the people should love and respect its Ministers; that they should look up to them in all times of difficulty, as their advisers, their fathers, and friends. Under such circumstances, the Clergyman's power of doing good would be infinite; and that is the species of power which he ought at all times, and probably often does, seek after. But he looks for it in vain: for the tithe system casts a bone of contention between the minister and his parishioners, which, in many cases, not only destroys all the respect which they ought to feel for their pastor, but also establishes in them a most inveterate hatred towards him. This unfortunate enmity often originates on a clergyman's taking possession of his living. His first step is generally, and naturally, to bring a surveyor into his parish; who must, if possible, raise the amount of the tithes, without considering how and when they were last valued. This frequently creates a suspicion amongst his

parishioners, that he attends more to his individual interest, than to the duties of his church; the parishioners, who are acquainted and connected with each other, often unite in their opposition to the increased demand: an inveterate enmity immediately succeeds; the clergyman throws the blame on the illiberality of the farmers, andthey in return blame their pastor. The whole blame ought probably to be attributed to the tithe system, which gives one man a power over, and an interference in, the property of many; and it is that species of power and interference, which must produce ill-will and enmity towards the person possessing it, as long as human minds, hearts, and feelings, continue to be formed as they have hitherto been.

One great cause for disagreement in the valuation of tithe arises from the nature of the system also, which is, that each party concerned values it at what it is worth to the other; and the difference in value to the owner and the renter is very great. The ill consequences to religion of these enmities must be evident; and I believe that more dissenters from the Established Church have been produced by this cause, than by any other; that the defection from that church ought not to be attributed to the neglect or want of zeal in its ministers, but to the tithe system alone, a system so ruinous in

its consequences, and so truly calculated to produce dissention between the minister and his flock, that I can only attribute the length of its existence to the excellence of the church to which it is attached, and to the general respectability of its ministers. This is the nature of that system founded on ancient and shrewd policy. How long it may exist, it is impossible to say; but of the truth of this assertion I am convinced,—That it will be the best policy of tithe owners to take a full and fair equivalent for the enormous property which they now possess; and particularly at this time, when the country at large is probably willing to give that equivalent.

Much has been said about the nature of that equivalent; *land*, and *corn rent*, are the only two likely to be approved of. I think the corn rent strongly objectionable, on the ground which I have before stated; namely, that the corn rent must rise with the price of corn, though the rent of the land may be kept down or depressed by the weight of taxes, or expense of cultivation.

Therefore by establishing corn rents we should do harm, by preventing the adoption of the superior plan.

With respect to the tithes in the possession of lay impropriators, it would only be necessary

to compel them, by the intended Act of Parliament, (when required so to do by a majority of the land-owners, as would be expressed, in that Act,) to sell or exchange them for land of equal value within a certain distance; the value to be ascertained by Commissioners in the usual manner, and the general system to be adopted in valuing being first pointed out in the Act of Parliament: which Act should also empower trustees for settled estates to give consent thereto.

Land appears to me to be the *only fair equivalent* which can be given to the *Church*.

The objections which have been made to land, I believe, are,—1st, the difficulty of procuring it in convenient situations; 2dly, the expense which may be occasioned by draining, and new cultivation, which ought not to fall on one life-holder; and, 3dly, the power it would give to a life-holder to injure his successor by exhausting the land by bad cultivation.

The whole of these objections might be shortly and easily answered, by asking the question,—if these inconveniences are experienced on the glebe-lands now held by clergymen for life? But I will point out modes of obviating them.

With respect to the procuring land in convenient situations, I should say, that any situa-

tion would be convenient within the county or diocese; for a clergyman would be in the situation of any other land-owner, and his residence on his estate would not be more necessary.

I would permit clergymen to grant leases for a term, not exceeding ten years, at the best rack-rent which could be obtained at the time, and which leases should be binding on their successors. No new leases should be granted, till the old ones had expired. I would have five per cent. on the profits of church lands annually vested in the hands of trustees, to be named by the Bishop of the diocese, and the patron of the living, to answer and pay, at the death of an incumbent, for any injury which the estate may have sustained by improper treatment. The damages should be assessed by valuers, to be appointed by the patron and executors of the late incumbent; and the balance, if any, should be paid to executors of the late incumbent for the uses of his will. The money, to the amount of assessed damages, should be paid to and expended on the estate by the new incumbent; who should be answerable for having so done, to the patron and bishop. And in case an incumbent shall have made any great and expensive improvements on the estate, either by draining, by cultivating waste land, or otherwise, and should not have

lived long enough to have been remunerated for the same, those expenses should be valued in like manner; and a certain portion of them, so fixed by the valuers, should be repaid by the new incumbent to the executors of the deceased incumbent.

With respect to the livings held by Colleges, I would allow each college to sell the tithes of all its livings, according to and under the direction of the Act of Parliament, and to purchase estates to the amount of the value of the whole; which estates should be managed by a committee composed of fellows of the college, and of the incumbents of its livings. The committee, or stewards appointed by it, should manage and let the estates, receive the rents, and pay them over to the different incumbents, according to the proportions which may be their due. These estates might be situate in any part of the kingdom, which would facilitate the purchases. I would permit colleges, and all patrons of livings, to sell, and purchase, and attach convenient glebe lands to their livings, whenever it may be in their power so to do; and I would facilitate the exchange of all church lands as much as possible; only, that nothing should be done without the consent of the Bishop of the diocese, who should appoint a commissioner to value, and to whom

it should be proved that no injury would be done to the church property thereby.

This exchange of tithe for land should only be made compulsatory on the tithe-owners, and patrons and incumbents of livings; who should at all times be compellable to make the exchange, whenever called on so to do by the proprietors of the land, or a certain portion of them, who shall conform to the Act of Parliament, and tender them land of equal value with the tithes to be exchanged, when valued according to the directions of that Act; and which land shall be within a given distance of the church, to be fixed by the Act. By these means the commutation would go on slowly and regularly, and would not have the effect of suddenly raising the price of land. As some persons who had no waste land to cultivate, some who had no money, and others who may not immediately perceive the advantages which would arise from the commutation, would not instantly exert themselves to commute their tithes; but they would gradually, and almost imperceptibly, be commuted, and cease to exist as a grievance. The benefits which would result from the measure would be gradually felt, thereby producing less sensation, and greater benefit to the country, than, I think, could be attained by any other mode.

No incumbent of a living should be compellable to exchange any part of his tithes for land, unless an offer should be made to him for the whole: and the land so offered to him should be situated all together, unless any part of it should be in his own parish, which might be added to his home glebe.

Whenever a majority of the land-owners, possessing two-thirds of the property in any parish, should wish to commute the tithes, and the remaining third should refuse to give their consent; the two-thirds wishing to commute should be at liberty to purchase land, and commute the whole tithe of the parish, whereby they might become possessed of the tithes of the other third of the land-owners so refusing to commute, and might either keep or sell them to the public as they might think proper. But the proprietors of those tithes should at all times be compellable to sell them to the land-owners, when called on so to do; and the price should be offered for them according to the mode of valuation directed by the Act of Parliament.

The mode of valuation I wish to point out is, that in the case of lay tithe, one valuer should be appointed by the owner of the tithe, another by the owners of the land; these two should elect a third, as is usual in most other valuations. For church tithe, one valuer should be

appointed by the incumbent of the living, and be approved of by the patron of the living, and the bishop of the diocese; the other by the land-owners. These two should elect a third. They should be directed to value all tithes at their *present* annual value, including moduses, and all other money payments to the incumbent of the living; but they should not interfere with any law-suit, which may be pending concerning any modus or other matter; and they should value the estate to be exchanged according to the same mode. My object is, that the valuers *should not value the probability or improbability of improvements on either side, which might be made on the lands, particularly on those to be exonerated from tithe:* for if those lands were not to be so exonerated, such improvements would not be made: and it is unfair to make money titheable, when vested in the cultivation of waste land, which was not titheable when in the public funds, or on mortgage; and, in fact, could not be made titheable by any other means.

Some of the great and good effects which I imagine would arise from a commutation of tithe for land are,

1st. That the cultivation of the waste land, which would in consequence take place, would produce so much work for the labouring poor,

and would create such a competition for their labour, that their wages would be raised by natural means to such a pitch as would once more enable them to live without parochial assistance; which might again restore that independence of mind and character, which has so long been absent from them, and which alone can produce emulation and exertion. And I most sincerely hope, that if ever that independence should again be restored, it may be preserved and fostered by education and encouragement.

2dly. That the additional farm produce which would be obtained by the new and improved cultivation of our land, would give support even to an increased population; and with the due attention of the Legislature of our country to its agricultural interests, this might once more become an exporting instead of an importing nation: whereby the alarms of scarcity would not again be heard of; and the immense sums in cash which have been annually sent out of the country for corn, thereby encouraging the cultivation of foreign soils, would be kept at home, and go into the pockets of our own labourers and mechanics. Added to which, foreign cash would be brought home by our exportations, and expended on our own land.

3dly. And the last good effect of the commutation which I shall here name, and which is

not the least in my estimation; it would remove that interference in property, which has caused more law-suits, more ill-will amongst men, and more defection from the Church to which it is attached, than any other human institution could possibly have effected.

It will be seen that the foregoing ideas have been hastily written down; but the writer hopes that they may be thought worthy of the inspection and attention of the Society to which they are addressed; and has the honour to remain their most obedient servant,

JOHN BENETT.

October 29, 1814.

ARTICLE V.

Statement of Fiorin Crop, at Stoneaston, Somerset.

[By Sir J. C. HIPPISLEY, Bart.]

To Mr. RICARDS, Secretary of the Bath and West of England Society.

Stoneaston House, 10th Dec. 1814.

SIR,

A Select Committee, appointed at a General Meeting of the Society, having inspected the crop of *Fiorin Grass*, planted in the course

of the last spring, at Stoneaston, it now remains for me to state the *progress* and *result* of the experiment.

The ground selected for this purpose is a tenacious loamy soil, on a grey lias naturally good, but, from having been ploughed *for a long succession of years*, was in a very impoverished condition. I had, at the beginning of the the year, no other convenient spot at my command, and I felt assured, that, if the result of the experiment should prove favourable under such circumstances, it must necessarily be so, in a comparatively greater proportion, on a *less abused* soil, Of this ground I appropriated *one acre and three quarters* to the cultivation of the *Fiorin Grass, after a crop of potatoes.*

As the expenses incident to *weeding the Fiorin*, especially in the earlier stages of its growth, have been objected to as very onerous, I was desirous to obtain some *countervailing* produce, making a quick return in the market, and thus opening a *new field of collateral experiment.* In this view I planted on *three quarters of an acre* of the ground thus appropriated *two bushels o the larger Tick Beans*, determined also to put this *impoverished soil to the test, without the aid of manure*, however disadvantageous the result might be, both to the *Fiorin* and *its coadjutor crop.*

On the *15th of February last*, the ground received a *single ploughing*.

On the *10th of March*, it was *once dragged over*, and the labourers began *clearing it from the couch grass*, which was very redundant.

On the *23d of March*, the *beans (two bushels)* were planted in *drills*, 3 *feet apart*, *intermixed with strings of Fiorin, in the same drills*; and between each row of *beans* and *Fiorin*, thus intermixed, *two rows of Fiorin strings were planted, exclusively*, at 12 *inches* from each other. The portion of ground so applied, I have observed, was *three quarters of an acre*. I must observe, also, that the *beans* were neither *earthed-up* nor *afterwards hoed*, but were destined to take their chance, in the common drills, with the *Fiorin*.

All the Fiorin was raised from *strings* transmitted to me about two years since, by *Dr. Richardson*, and planted in a *store-bed*, where it has continued to thrive very abundantly, each year encreasing greatly in volume, and, by its *close matted pressure*, keeping the ground beneath it comparatively free from other grasses and weeds of every description.

On the *5th of April*, we began to plant the *remaining acre*, from *the same store bed, exclusively with Fiorin strings*. The whole was set out in rows, 12 *inches* asunder.

The weather, during these successive operations, proved extremely unfavourable, chiefly from frost: the planting, consequently, proceeded under great disadvantages, from delay and increased expense.

On the 19*th* of *September*, pulled and cocked the *crop of beans*, which, in the following month, yielded 34¾ *bushels*, of a very fine quality,—a product, which, even at the *present rapidly reduced price*, constitutes a very handsome set off against the expenses attendant upon this *aggregate cultivation of Beans and Fiorin*, as will appear by the annexed schedule (A).

On the 28*th of November*, I had cut a *portion of the Fiorin* which had been *exclusively planted*; by measurement 10 poles in length, and 2 poles in breadth, or the *eighth part of an acre*; the produce weighed amounted to 21cwt. 13lbs. but the ground, from want of rolling, having a very *unequal surface*, the Fiorin was cut to a great *obvious disadvantage*.

I requested a very respectable farmer, Mr. Thos. Robbins, the greatest occupier in the parish, to be present at and attest the weighing, as an additional check upon my own servants.

I had also cut a *square pole of the Fiorin which had been raised under the Beans*, the produce of which weighed 1cwt. 15lbs.

I have since cut the *remainder of the acre of Fiorin, exclusively planted*; the weight of which amounted to 7 tons 15 cwt. and 10 lbs.—*Vide schedule (B.)*

Had not the construction of the article in the *Premium List of the Society*, under the head of *Fiorin Grass*, seemed to imply that *an acre at least should be cut, as well as planted*, to ascertain the product; I should have been induced, for the first year, to have let the *remaining part of the crop* stand over to *another* season, except drawing from it *partial supplies of green food, experimentally*, for the use of my *dairy* during the *severest winter months;* as I conceive, the increased growth of this *young crop* would necessarily have given it a great *superiority* over the less powerful indigenous grasses that might intrude themselves, but which would be materially checked, if not wholly destroyed, by the *weighty ascendancy of the Fiorin*:—and the facility of procuring a supply of *green food, in the severity of winter*, always presented itself to my mind as the *most prominent recommendation* of the *Fiorin* cultivation.

From an observation of the *ground since the cutting* there is every appearance of healthfulness in the plants, and I have no doubt but that in the next season the part which was appropriated to the *mixt crop* of Beans and Fiorin, will rival

its neighbouring acre. By the aid of the *roller* alone, the *scythe* will be better enabled in future to do its office; and the general increase of the crops will, I am equally persuaded, correspond with the assertions so often made by Dr. Richardson, of the great vegetative powers of his favourite grass.

Although, from experiments *casually* made by myself, and others in my presence, since the first introduction of the fiorin, as a crop, in this country, I had long since been disposed to think that the statements in its favour were well founded; I *considered myself more particularly called upon, on the present occasion,* to endeavour to ascertain its utility as applicable to the *economy of the dairy*. To this end I put several cows to feed upon *fiorin* exclusively, carefully noting their product of milk when at large in the *meadows,* adjacent to the cow-stalls, (which at present yield no contemptible pasture,) fed also with common *hay* twice a day;—and noting also their produce, when *confined to the fiorin alone,* supplied *green from the field.* The result of an experiment of this description, made, in the course of the last week, upon *seven meals or milkings of two cows,* was *half* a pint in favour of the period of their *usual feed* on the *common meadow and hay*; but it is fair to observe, that one of the cows, during the two first meals, *in fact, during*

the whole of the first day, was observed to eat very little of the fiorin, though she took it freely in the following days; and since the experiment, the milk of *this cow* has been separately measured, and found to have been little more than the half of what was yielded by her companion, and is falling off in a still greater proportion. I mention this circumstance, as somewhat unlucky for this experiment; as I have little doubt, but if the cows had been equally hearty, that the product would have been decidedly in favour of the *exclusive green food of the fiorin*; or, if the experiment had been made with the fiorin, *prior* to the account taken of the *ordinary* produce. But taking the result of the experiment as it stands, we have to estimate the deficiency only of *half a pint of milk* upon *seven meals* of *two* cows, on the one acre; and the saving the supply of the *hay usually supplied* on the other. The value of the *fiorin grass* set off against the consumption of common hay, and the meadow feed, is another subject of calculation, which I do not at present enter upon; as the experiment is now but cursorily mentioned, to offer a temptation to others who may be disposed to pursue the same line of investigation.

After so much has been written, and so ably, on this subject, it would be a work of great supererogation in me to attempt the further eulogy

of this powerful, nutritive grass; I will only say, that my own observation and experience leave me no ground for scepticism. But inclosing this cursory report, I think it my duty to observe, that had not the *precise letter of the Society's injunctions* confined the cultivation of this *experimental* crop to *fiorin, originally of Dr. Richardson's farm;* I should have had but little pretension for requesting the inspection of a Committee upon *that,* which is the subject of this address; while, *in my neighbourhood, at Timsbury,* the cultivation and result of *two acres* of fiorin, planted by a Reverend Vice-President of this Society, stand, I am persuaded, *unrivalled in the western counties,* both for *product* and *purity.* The whole of this flourishing crop has been collected *from his own vicinage,* by *Mr. Barter,* with a zealous perseverance and intelligence worthy of a disciple of his great and venerable prototype; and the *result* has evinced the *facility* of rendering the *dairy,* at least, independent of the *hay stack,* (as usually administered) in the *severest seasons,* by the application of what had long been estimated *as a noxious weed,* to the purposes of a *nutritious vegetable aliment.*

I cannot close this letter without expressing, as an individual member of the Society, my sense of obligation to Mr. Barter's laudable exertions, combined with an anxious hope that he may be

induced to favour us with a *report of his experiments*, in the course of his attention to this *rational* object of his predilection.

I remain, Sir, yours, very faithfully,

J. C. HIPPISLEY.

P. S. It was my intention to have delayed reporting upon the experiments till to-morrow, as I was desirous to ascertain the result of a trial with *other cows I had put on the fiorin:* I therefore had not commenced my letter, till I received, *this day*, your *summons to send my report.* I have been much interrupted in making it out, and must request the Committee to excuse any defect of clearnesss in the statement; but *I pledge myself to the facts.*

I omitted to state, that the best yielding cow, when put on *common hay after the fiorin*, (by the *report of the dairy-maid,*) "*refused to feed upon the hay for a considerable time.*" It is much to say, that the *ordinary attendants of a dairy* should be *fervent* to give evidence in favour of *novel experiments*, so *widely departing from the accustomed practice.*

I shall bring in, to-morrow, some butter, churned from the milk of the cows fed on *fiorin.*

SCHEDULE (A.)

Statement of Expenses incident to the preparation, planting, &c. of One Acre of Ground, in the parish of Stoneaston, with Fiorin Grass; and Three-quarters of an Acre, with Fiorin and Beans intermixed.

	£.	s.	d.
To ploughing 1¼ acres, dragging once over, and picking couch	0	12	2
To planting 2 bushels of beans, with *fiorin* intermixed, as stated	1	18	0
To planting 1 acre with fiorin strings exclusively	2	7	0
To weighing at different times	4	5	9
To pulling the beans, bundling, and cocking	1	1	0
To thrashing out 34 bushels and 3 pecks of beans	0	11	0
To mowing one acre and a plot of fiorin grass, cocking, &c. *weighing*	0	14	0
	£11	8	11

SCHEDULE (B.)

Amount of Grass (Fiorin) *cut on* $\frac{1}{4}$ *of an Acre.*

No. 1.

Weighing.	Cwt.	Qrs.	Lbs.
1	1	2	0
2 ...	1	2	7
3	1	2	2
4	1	2	0
5 ...	1	2	10
6	1	2	1
7	1	2	0
8	1	2	0
9	1	2	0
10	1	2	14
11	1	2	0
12	1	2	7
13	1	2	0
14	1	1	0
Nov. 28.	21	0	13

THOMAS ROBINS, of Stoneaston.

No. II.

Amount of Fiorin Grass cut on One Acre, at Stoneaston.

	Tons.	Cwts.	Lbs.	Tons.	Cwts.	Qrs.	Lbs.
Cut the first	0	21	13	7	15	0	10
Cut the second*	6	14	25				

* What remained after the first cutting to complete the acre of admeasurement. Farmer Robins could not attend the 2d cutting.

No. III.

Amount of Fiorin Grass cut off Two Poles, planted with Beans.

Cwts.	Qrs.	Lbs.
1	0	15

As witness,

WILLIAM GIDDINGS, gardener to Sir J. C. Hippisley.
JOHN DAY, farm servant to Sir J. C. Hippisley.

The above amount of seven tons fifteen hundred and ten pounds, and one hundred and fifteen pounds, we state, on oath, to be true, having each of us weighed the same.

WILLIAM GIDDINGS.
JOHN DAY.

Sworn before me this 10th day of Dec. 1814.

J. C. HIPPISLEY.

ARTICLE VI.

A Report on the Cultivation and Application of the Fiorin Grass.

Viresque acquirit eundo. VIRG.

WHEN about four or five years since, Dr. Richardson prevailed on the agriculturists of the united kingdom to listen to his elegant and classical account of the wonderful properties of his favourite Fiorin Grass, or *Agrostis Stolonifera;* with whatever approbation they might view the stile and manner of its introduction, they did not hesitate to express their fears, that the pictnre had been much overcharged, and that some abatements of strict accuracy might be indulged to an Author, who appeared to be actuated by so strong an enthusiasm, even of doing good. Whilst one party was loud in condemning the very principle of its cultivation, as contrary to common experience, nay, common sense,—another, less hasty, and more open to conviction, thought it their duty to enquire, whether the Doctor's assertions were

founded on truth; and principally, whether his own character and respectability were placed beyond the reach of suspicion. When a cloud of witnesses had dissipated both these doubts, all reasoning on the subject was at an end, notwithstanding the paradoxes which the Fiorin seemed to involve. The facts in Ireland had been established; and there was every reason, from analogy, to conclude, that the sister kingdom might not be less benefited by the new discovery. With this view, our Society has, for the two or three years last past, by large premiums, invited experiments to be made on its culture: and success has crowned their efforts, as they have awarded two premiums, in two different years, to two of our most respectable Vice-Presidents.

The possibility of raising the Fiorin Grass in England being thus established, the Society now looks forward to its more general cultivation and application; and that nothing might be wanting to attain these objects, it has offered, in this year, to the best Essay or Report on them, founded on the author's own experience, a premium of Ten Guineas.

Acknowledging myself to have been much stricken with Dr. Richardson's captivating description of the Fiorin Grass, I endeavoured, under his directions, to learn the habits of this

extraordinary plant; and for this purpose, in the autumn of 1812, I planted between four and five perches with it, on land worth about 40s. per acre. The plants or stolones were purposely collected from the hedges and ditches of the adjoining grounds; because, in case of success, one objection, at least, to its more general adoption, arising from the difficulty of obtaining plants, might be removed; whilst, at the same time, the most ample prospect of a large return might be presumed, from the great luxuriance of some of the stolones, extending themselves to the distance of six or seven feet in all directions, frequently climbing up the hedges, and almost choaking them with their powerful embrace. The plants were laid in shallow drills, at sixteen inches apart, in the month of October, and lightly covered over with earth. Great care was taken, in the subsequent spring and summer, to hoe between the intervals, and to destroy every species of weed; for on this *sine quâ non* depends all hope of success: very little trouble or expense is required afterwards, as the thick growth of the crop will smother all future interlopers. The general result of my experience from this small breadth has been, that the produce of a perch, cut after two or three dry days in the beginning of November, weighed 140 lbs., which by drying was reduced to 80 lbs. or four-sevenths of the

green weight. Mowing the Fiorin Grass is much more difficult and laborious than mowing common grass; it adheres so closely to the ground, by means of its hairy roots, which grow at almost every joint, that the scythe is not easily forced under it; and after the cut is made, the weight and entanglement of the swarth is so great, that considerable address is necessary to turn it over, and disengage the scythe. In order to facilitate the mowing, my servant first uses a cutting-knife, with which he perpendicularly separates the Fiorin into strips of three feet breadth, when they are more easily penetrated by the scythe, and turned over. The before-mentioned quantity of 140 lbs. per perch will require at least a third greater breadth of land to cock and dry it on, than that on which it previously grew. When first cut, by adhering so closely to the ground, and in so great quantity, neither the scent nor colour is very inviting; the former is, if not fetid, very earthy; the latter, a dark yellow, like hay sodden in the summer with continued rain. In this state my horses will not touch it: to correct, therefore, this evil, the swarths must be well shaken and separated, and put into small cocks; then the greater quantity of rain that falls on it, the more it will be purified, and the fine particles of earth which adhered to the roots will be washed off. One turning at the end of

ten days or a fortnight, whether in rain, frost, or snow, will thoroughly prepare it for use; the disagreeable smell will have vanished, and the yellow sickly hue of the stolones will be exchanged for a light grey. In the last year and the present, two happy opportunities, as I thought, were afforded me both in October and November, of drying a considerable quantity of Fiorin; but in this dry state my horses absolutely rejected it, and I began to fear that all my labours had been in vain; when recollecting that it had never been more grateful to them than when eaten full of moisture, just imbibed from rain, I steeped a quantity of this dry and sweet Fiorin in a pail of clean water for about a quarter of an hour, which being offered to them they devoured instantly. It is, therefore, now my practice not to attempt drying it; but after it has been cut about ten days or a fortnight, to bring it from the field as it may be wanted, in all weather, and give it to my two horses, who wholly live on it. The quantity they consume in 24 hours is 50 lbs. each; less, I believe, would suffice them, but my servant, like most other servants, thinks that they ought not to be stinted; they are both, however, in very good condition.

Having experienced so much satisfaction from this small spot of four or five perches, I was determined to extend the plantation to an

acre, in the year 1813. It was begun early, in hopes of my being able to furnish our Society with some report of it at the succeeding Annual Meeting. The ground was a good pasture field, worth £3 per acre, and measured exactly 161 perches, or 1 acre and 1 perch.

In the beginning of January 1813, as the weather permitted, the turf was inverted by a spade to the depth of four or five inches; on the back of it the Fiorin was planted as before, in the months of February and March, at sixteen inches distance, with stolones from my former plantation. Though every care was used in all the several operations, owing to some unknown cause, such a general failure in the growth of the plants began to appear in the latter end of April, and beginning of May, that it was judged best to plough the whole down, and give the ground a complete summer fallow; which was effected by three ploughings, and four draggings and harrowings. Though this was a grievous disappointment, yet it may not be without its use, as it may warn the cultivator of Fiorin to depend more on autumnal than spring planting. In the beginning of October, the stolones were put into the drills at sixteen inches, as before, and the whole acre finished on the first or second of November. The planting was performed by one woman occasionally, and three or

four girls from twelve to fourteen years old; a line was attached to two sticks of sixteen inches length, (the space between the drills,) and being stretched the whole breadth of the field, a sharp-pointed hoe was drawn by the side of it, and made a drill about an inch and a half deep, into which the stolones were laid lengthways, and kept in their places by small quantities of earth heaped on them by the hand. Though both the trouble and expense be increased by this mode of planting, yet the certainty of effectually destroying the weeds in the spring and summer, by means of the vacant interval, will more than compensate for both. The woman's and children's labour in the planting cost about £1:15s.; the hoeing in the spring and summer of 1814, and replacing some plants which had failed, done by women, cost £2:5s. In the last spring and summer it was again looked over, and the weeds that appeared were drawn by hand, at the expense of 15s.; and it now exhibits as clean a surface, and as uncontaminated by weeds of any sort, as could be wished; and there appears little probability of any further expense being incurred on their account.

The value of the crop of last year may be easily ascertained, as my own two horses, besides those of occasional visitors, were wholly fed with it from November to May; whereas,

during the same period, in the former year, my tenant was paid £11: 16s. for the hay, at 4s. per hundred, consumed by the same horses: there was besides much given away for transplanting, much trodden into the ground and wasted, from the field having a footway through it, and at least half a ton dried and unconsumed, which was mixed with the common hay made in the beginning of June.—The land (if good land be employed) most easily and least expensively applicable to Fiorin is ground that has borne early potatoes, and been cleared before the end of September. If there be any crop that more generally engages the attention of the cultivator, it is that of potatoes, both as to manure and weeding: little more, therefore, need be done, than levelling the ground with a pair of harrows, when the planting of the Fiorin may commence. It has been frequently said, that poor hungry soils, fit for nothing else, are alone adapted to Fiorin; but if my data be true, that land worth £3 per acre can produce a substitute for hay, for two horses at least, during seven months, with a surplus of half a ton at the end of that period, it will be difficult to find any other *grass* product of equal value: for it should ever be remembered, that in all comparisons of the value of Fiorin grass, they should only be

formed between the value of that and of any other species of *grass*. Had I, in the spring of 1813, let my acre of land for raising potatoes, at 1s. per perch, which was repeatedly offered me, the whole outgoings of planting and cleaning the Fiorin in the following spring and summer would have been doubly reimbursed; and may be adopted in future, with certain advantage, by any cultivator of Fiorin. It is but fair to acknowledge, that the expense of turning my land first by hand with the spade, and then giving it three ploughings, and four draggings, was very considerable: one consolation, however, attends it, which is this, that no one, who may chance to read this report, will again incur it; and that "happy is he," as the adage says, "who is made "wise by another's misfortune." In the spring of the present year, the acre of Fiorin was lightly covered with six ton of a compost heap of dung and road earth; whether it be absolutely necessary, or not, experience does not enable me to say, but it certainly deserves it, as it affords so large a quantity of produce, from whence manure is made; and there are few crops that are not meliorated by the dung-cart. From observing the habits of Fiorin, which grows with the greatest luxuriance in places abounding with water, particularly in the carriages and gutters of watered meadows, there can be no doubt, but where irri-

gation can be applied to it, its utmost possible produce may be expected.

Though in order to furnish the cultivator of Fiorin readily with plants, Dr. Richardson referred him to the ground under the north wall of his parish church; it still seems probable that there is some difference between the specimens found in that situation, and those with which the Doctor has favoured many of the members of our Society. The stolones in Sir J. C. Hippisley's field, and those on Leigh Down planted by Mr. Miles, both from Dr. Richardson, were much larger and longer in their stolones and leaves, than any which are indigenous in our own neighbourhood. Whether the greater nutritive quality, or superior quantity, be in one or the other, I am not enabled to judge; but it is my firm belief, that the least productive of the two furnishes sufficient encouragement for its propagation. It is not an easy task to ascertain, with exactness, the weight of a perch of green Fiorin, because so much depends on the quantity of moisture it may at that time contain; the same perch, cut in a drying easterly wind, and weighing only 140 lbs., would, in consequence of a shower that lasted not half an hour, be increased in its weight 20 lbs or 30 lbs.; or, should a severe frost overtake it, such is its exsiccating quality, that, in less than 24 hours, it will be reduced to

90 lbs. or 100 lbs. Still all these different meteors do it no injury; frost, snow, rain, and hail, find and leave it in the same edible situation. During the snow of last year, which continued about a week, a farmer passing by my Fiorin field, and curious to discover what rational employment my servant could possibly be engaged in, expressed the greatest astonishment on being informed, that he was only raking the cocks of Fiorin together, which just emerged above the horizon of the snow, that he might carry them home in a cart to his master's horses.

The Fiorin, being an aquatic plant, grows most luxuriantly in wet weather, and continues its growth till the end of November, and sometimes a little longer, unless checked by the frost; before that period, the hardest frost only suspends, does not put an end to, its growth. The last autumn has been remarkably dry, which is, perhaps, the reason why my crop of Fiorin, though by no means deficient, has not been so large as might have been expected from so good land, and such good cultivation. There was one feature attending the Fiorin of this year, which it almost wholly wanted in the last,—a most beautiful fleece of panicles, of a reddish brown colour, equally covering and waving over the recumbent grass. It is a well-known property of some plants, that, by being suffered to

drop their seed, they lose some portion of their future strength; and such, possibly, might have been the case with my crop, as a multitude of thin white effete stalks were cut and intermixed with the stolones. A portion of the Fiorin field was purposely omitted to be mown till early in last March, but no other inconvenience appeared to accrue from it, except that the plant was not so succulent, and the roots at the knots much elongated; it would therefore, perhaps, be more prudent not to defer mowing to so late a period, as exposure to the weather never injures the crop.

Though I have exhausted all my memoranda of the Fiorin, as applicable to the stable, I am fully aware that the Society's views were directed also to the dairy. Cows I have none; but to shew my readiness, as far as I am able, to comply with their expectations, I have prevailed on a neighbouring amateur to tie up one of his cows for a week or ten days, and ascertain the produce of her milk on his best hay; and then to feed her for an equal portion of time on my Fiorin, and to favour me with the result. The hay trial is ended; that with the Fiorin began last Wednesday night, the 6th instant. The final result, when known, shall be communicated, and form the concluding part of this report.

Though I had been three or four times to see the success of the Fiorin experiment with my

friend's cow, and had heard from him most of the particulars, yet that the strictest justice may be done it, I shall transcribe his own account of it just sent to me.

"I have felt a very considerable degree of "interest in the result of this experiment on the "effect of Fiorin on milch cows, and have given "the strictest directions in my power that every "attention should be paid to its accuracy. The "outset of your experiment augured the most "complete success. You have been told that "the cow, when the Fiorin was first presented "to her, did not notice it; but having tasted, "ate it with the greatest avidity, and would "not be induced to return to the very good hay "she had before been fed with. This disposition "continued for two or three days, and the milk "certainly rather increased; when she lost this "keen relish, and with all the attention that "could be given to the subject, has never re-"covered it. May not this have been dependent "on some accidental circumstance, and not on "the general effect of Fiorin? I regret that "you left your experiment so very late, as to "preclude all possibility of revision or correction "of real or supposed errors.

Result of Experiment.

" Ten days fed on particularly good two-years
" old hay. Milk, average per day 13 Pints.
" Ten ditto on Fiorin, ditto 11 ditto.

	lbs.	oz.
" Weight of *hay milk* per pint, during the " above time	1	2¼
" Ditto of *Fiorin milk* ditto	1	2

" The flavour of the Fiorin butter was cer-
" tainly superior to the hay butter, and it was
" also sweeter; at least this was the united opi-
" nion of my family.

" Average quantity of hay daily 33 *lbs.*
" Ditto of Fiorin 50

" I would direct your attention to (what appears
" to me) the great disproportion in consumption;
" and whether the small proportionate quantity
" of Fiorin does not point out some not generally
" existing cause.——The cow is a very large
" and a very hearty one."

Such is my friend's plain and sensible account of the success of his experiment for ten days; but as he is a great invalid, and could only give directions for the proper feeding the cow, if any prejudice, arising from the novelty of the subject, or the dread of more personal trouble, existed in the minds of the labourers, to whom that office was assigned, we need not look far for the cause of the cow's altered appetite.

An unusual pressure of engagements prevented me from attending earlier to the cow experiment; but if my valuable friend will lend me his further assistance, it is not yet too late to repeat it, and to communicate the result to the Society at their February meeting.

It is now my intention, as I have this year submitted to the Society a report of my experience of the Fiorin Grass, to continue yearly a register of such new observations on its produce and uses, as may be thought interesting to the public, and communicate them to the Society in any form which they may please to direct.

W. B. BARTER.

Article VII.

On the adapting of Plants to the Soil, and not the Soil to the Plants.

[By Mrs. Agnes Ibbetson.]

TO THE SECRETARY.

IT has long been my intention to address a letter to that Society, who several years past honoured me with what I considered as the *most flattering* and highest proof of their approbation: but constantly occupied in dissecting and studying *the nature of plants*, I was perpetually pre-

vented fulfilling my wishes; but within the last few years, having endeavoured to draw *results* from the *dissection* of vegetables *applicable* to *agriculture*, and having the use of a pretty large farm to assist theory by practice, I shall, with the greatest pleasure, dedicate my future services where gratitude should lead me to offer them, if any thing I can write can possibly be acceptable to so eminent and learned a Society.

I have been lately much employed in endeavouring to shew that all plants should be divided, disposed, or placed, according to the different soils, congenial to their habits, from which they originally proceed; and that it is to the total inattention to this circumstance, that we probably owe the very strange and contradictory results constantly to be found in all agricultural reports. No person can read with attention the late accounts delivered to the House of Commons, respecting the growth of corn throughout this kingdom, without being struck with the contradictory returns transmitted of the whole; and without being convinced, that there must be some hidden cause for such a strange diversity in the gains of the *farmer:* as there are many instances adduced, in those reports, of the same excellent management, where the same seed has been sown, an equal degree of labour performed, with the same *season, time, and manure* employed, and

one farmer has gained three times as much again as was expended for putting in the crop, while *another* has scarcely exonerated and repaid himself for the labour and seed: what then could be the cause of the loss of the latter, and gain of the former? It must, I am convinced, be attributed chiefly to the agreement or disagreement of the plant with the soil in which it is placed, its situation, and aspect; three things, of which the farmer knows but little, or ever takes into his calculations. He has but one way of putting in plants, *loading the earth with manure.* But to adapt the plant to the soil from which it originally came, to *suit* also the *manure to both*, that they may exactly agree, and not injure the vegetable; that the situation of the plant may be consulted, with respect to humidity and dryness; and that, to complete the whole, the *aspect* also may be fitted, so that the plant that *loves* the *sun* may be exposed to it, while that which prefers shade may receive it:—these are attentions truly wanting to our agricultural system, as I hope to shew.

It has been a subject of considerable enquiry among agriculturists, as in what consists the food of plants. Some have attributed it to water, some to earth, and others to air. To all these sources vegetation is indebted; the fertilising principle of all manures is referrible to the extractive

matter arising from decomposed animal and vegetable recrements, and in this state soluble in water, which is the carrying medium into the vegetable substances. Vegetables will not grow in pure earth, or pure water; some plants are so organized as to require only mechanical support from the soil, abstracting their nourishment from the atmosphere by means of their leaves; whilst others from their roots depend upon the soil for their support. Although many plants will grow in different soils, yet they have all their favourite ground; and it is more easy to accommodate the plant to the soil, than to adapt the soil to the plant. By knowing, therefore, what sort of plant the farmer is going to put in, he may of course be regulated with respect to the quantity and species of manure required, the aspect wanted, and the degree of humidity and dryness requisite for the plant. All plants came originally from a peculiar earth; either from clay, sand, gravel, chalk, or loams formed from a mixture of some of these, or from a very wet or dry soil; and though many plants will grow indifferently in several species of earth, yet they have all their favourite ground, *that* which they *evidently prefer*. Now to make the soil fit for the plant, is certainly a very expensive thing; but to adapt the plant to the soil is not only an easy, expeditious mode, but one which requires infi-

nitely less assistance in dressing, labour, seed, and care of every kind. It is true that all cultivated plants demand some manure, because nature gives not salt and oil *enough*, in *any earth*, to do without *some assistance* of this kind; but the plant that is natural to the soil requires infinitely less than that which is adverse to it, and may therefore be cultivated at a quarter of the expense. Now nature is so bountiful, that there is scarce a plant necessary to the food of man and animals, that, if we choose to seek it with care, has not *one peculiar sort* calculated for *every soil.* Thus in clovers, there is a sand clover, a clay clover, a gravel, and a chalk, clover; one that grows well in rich lands; and one that would be ruined in a good soil, and can grow and do well only in a poor one; one that will not endure moisture, and one that only grows in wet land; one that prefers hills, and one that will grow in vallies alone; one that likes the sun, and one that covets shade. Nature has been equally bountiful in most other plants peculiarly adapted to *agriculture*, and in which there are *quite as many species* fitted for *poor land*, as for *rich ones;* and, if planted in their own soils, give an infinitely *greater return*, and are not subject to those *dreadful disorders* but *too common* to plants placed in improper ground. I have repeatedly traced maladies arising from this source, that afterwards

tainted the very means of life in a vegetable: and being constantly accustomed, when I heard of any extraordinary crop, to proceed to the place, and enquire thoroughly into the cause and management made use of by the farmer, I have generally found the success to proceed from accidentally putting the plant into that ground from which it originally issued, and manuring it according to the quantum of juices it received from the earth, and with that matter likely to form a proper compound adapted to its wants; in short, attending to the right rules of vegetable economy, and the common process of nature.

But I am sorry to say, that, in examining innumerable farms, *diversely situated*, I have but too often found this order reversed; the chalk plant put in sand, the sand plant in clay, and so on; and, what is still worse, the watery plant put in dry ground, and the dry vegetable in a wet soil; and in all these cases they cannot fail of making a very bad crop. A plant accustomed to a poor soil, placed in a good one, *rots;* while the one that prefers a *rich loam* is *starved* in *a poor one.* A clayey plant put in sand is blown out of the earth, for want of those *retentive powers* the root is used to; while the sand plant, placed in clay, decays at the root from the under moisture which it cannot bear. The chalk plant, also, placed in gravel, is destroyed by its own

acidity, which is *no longer subdued:* for most plants (if the farmer do not grudge the making the soil) he may certainly do it, but it can never answer in point of expense. It is a strange mistake, and a most fatal one, that almost all, even *some* of our *best, gentlemen farmers* fall into, viz. that they cannot manure *too highly*. Now this is so completely the cause of innumerable failures, that I am most anxious to censure the practice. It always reminds me of the account given by Miller, of what was done in the *West-Indies*, when some botanists were desirous of bringing over some fine plants of the *cactæ species*. They enquired not what the plants *were*, but wholly inattentive to their being *rock plants*, they put them into tubs of the richest soil they could procure; the *plants all died:* but this was looked upon as accident, and the same process again followed, when one of the casks breaking, they concluded the plants must die, as the earth had left them; and flinging on them some dry sand, which happened to be in the way, ordered the cask down to the hold, when to their great astonishment the plants so treated *lived*, while those in the other cases died, as usual. This opened the eyes of the gardeners with respect to rock plants; but to this day sand plants, instead of having a poor soil, generally receive a rich one. There is not a more ruinous effect

than that produced on the plant of a poor soil placed in rich ground. Some time since a gentleman brought me some turnip roots that had in the same manner failed for several years; and the potatoes had equally been vitiated the preceding year. It is, I find, a *common disorder*, in *gardens* especially, and all *rich ground*. When I dissected the plant, I found the wood or sap vessels of the root were rotted off, and in their stead a number of large bladders of putrid water remained, as a sort of swelled and distorted root. But almost all nourishment from the earth was suspended, and the leaves alone retained a sort of life, from the nutriment they received from the atmosphere, while the washy and putrid effects, the consequence of nutriment, seemed to poison all the rest. The potatoes were nearly in the same condition, the roots all decayed, nor forming any bulbs: but when *peas* or *vetches* were placed in the same ground, they grew remarkably well. Now this is *certainly* a proof that a plant can be destroyed by a decided aversion to the soil in which it is placed; which will, notwithstanding, admirably agree with many *other vegetables;* and that the plant of a poor soil can be as much hurt in a rich one, as the plant of a rich in a poor soil.

I have also known the same disorder seize trees, on being put into ground too rich for

them. A friend of mine having just made a garden, which was not yet walled in, left a row of the *salix caprea* in a hedge to shade a walk. Being desirous of having very good vegetables, he manured the ground to the most excessive degree, *even to the edge of the trees.* In two or three years his trees began to decline, and at last got so bad, he consulted me what he should do with them. I advised the taking one for examination. I found most of the wood of the root decaying, while the side radicles were turned into putrid bulbs. We uncovered all the rest of the trees, and flung dry sand on them, mixing it with the earth that surrounded the roots: we saved all *but three.*

In tracing the various expenses necessary to a plant put out of its peculiar earth, I shall first mention *manure* as the most considerable. In proportion as the ground is adverse to the *plant,* so much more does the farmer load it with the only remedy he is acquainted with, " *dressing,*" to enable the plant to shoot. If the manure do not afford the juices it requires, and which its natural earth would *certainly* have *bestowed,* the *crop fails;* then the quantity of seeds must be more than doubled, which creates a second expense. Why are they obliged, in one county to put in so large a measure, and in the next half the quantity? Because not one seed in three

takes effect, from not having those very juices dispensed to it its seeds seek, and the plant requires to give it vigour and force to grow. The ground is said to be full of seeds: *I believe it;* but the soil can only support such a number of plants; the seeds wait, therefore, till they can possess themselves of that *stimulus* wanted for their increase. Now dung happens to be composed of those ingredients necessary, of that salt and oil required by almost *every vegetable.* If, therefore, the soil be dressed with it, the seeds belonging to each peculiar ground shoot directly; and the sands send up *sand plants,* and the *chalk soil chalk plants,* and so on to the rest: for it is a great mistake to suppose that the embryo plant is concealed in the dung; indeed the vegetable, thus always appertaining to the soil, proves the contrary: but if the manure be not suitable, then that stimulus is still wanting, and the crop is *again said to fail.* How often does this happen; because some bad season makes the want of that peculiar juice doubly missed: then labour is a third expense, which must in excess belong to that plant which is placed in a wrong soil; for it will never be said that the vegetable that can grow spontaneously in that peculiar earth, can want any addition, besides the little manure, to increase its vigour, and render it more productive. All the labour, then,

of dibbling, and throwing up the earth, might be saved in that case: indeed, this is a trouble that, I think, (if I might venture to say so,) might be saved in *many soils*. In clays, in chalks, or loams, it must be excellent, where a little motion of the earth round the roots of the plants, and an opening of the ground to admit the air, and dry the interior, must be most wanted, besides breaking the clods of earth; but in sand and gravel, that require no drying, or in a rich loam perfectly pulverized, it only deprives *that earth* of its little *moisture*, and moves the roots, where you would rather wish to render them more fixed and steady in the ground. And if it be on a hill, where the soil falling down renders it thin, I have seen the practice kill many plants, by depriving them of the side thickness and moisture, which would otherwise compensate for the little depth of earth above.

I have now endeavoured to shew, that one of the principal parts of farming should be thoroughly to understand the soil of each field, and its sub-soil, and the *sort of plant* that suits that *peculiar ground*, that the farmer may be able to adapt them to the earth of which his estate consists; especially where, if he wants more variety, they are to be bought or exchanged with ease. The only desire of most cultivators is to make the farm answer in point of expense. This is

all I mean by the plan I am suggesting,—"that "that plant will yield a vast deal more in its "own soil, and will repay for buying or ex- "changing that which would not grow without "too much expense." How few are the plants that can possibly be wanted! ten or twelve at most: how easy, therefore, to suit these to his estate! A couple of different kinds of wheat for each soil; oats that agree well with it; and clovers that are naturalized to it. There are some plants that all farmers grow, but that nature seems to have made *as substitutes* to each other, for feeding of cattle; I mean, turnips, carrots, parsnips and cabbage: they each claim a different soil. The turnips do admirably in sand, the carrots in sand also, the cabbage in clayey ground, and the parsnips in good ground: as to potatoes, though preferring a *drained boggy earth* to all others, yet they are *so necessary*, they must grow where they can. But there is a terrible mistake in this country, in supposing they should be planted in dry ground; as the potatoes (I have proved, after sixteen years experience) will never be mealy, if not grown in tolerable *moist earth*. As to the others, one of them might be chosen as best suiting. It is true, that a plant grows sick of the ground in which it is placed too frequently; because the peculiar juices are *exhausted*, which sustained and supported it. But

a year's interim is sufficient to renew all, and restore the earth to its usual vigour; especially if a fallow *intervene*, of all the assistance the earth gains, the most *admirably advantageous;* for it is the manure of nature, if weeds are *not allowed* to grow on it: for *if they do*, they rob it of its richness, and burying them can make but poor amends, (by their crude and half-digested juices,) and can compensate but little for the support of a naked winter fallow.

That I should venture upon so daring a task, as to give hints to those very gentlemen who possess *such talents in agriculture*, so famous for their well-earned renown, seems a degree of presumption I must apologise for, as it shocks even myself: but from the first moment of my dissecting plants, I thought it must suggest ideas of this kind, and I have with care collected them. I may be said to arrive at the science by another road, one untried before, and of course having a different view of the subject. In dissecting, I could not but see that nature had formed the plant peculiarly for that individual soil, and to conform itself to its nature, *in every respect* suiting its defects, and possessing each its proper juices, in chemical affinity *with those* of the *soil*, but with that one only. Seeing this, may I not, with all humility, declare it, leaving to every one to draw their own conclu-

sions? satisfied if one hint thrown out can be of service to those whose science enables them to judge so wisely of the matter. In this case I shall be happy in the undertaking, and think myself repaid for my labours.

I shall now give the clovers, and trefoils, &c. adapted to each soil; and should this letter be so fortunate as to please, I shall in my next give the other plants equally suiting each earth.

Clay.

Trifolium minus, - - - (Small Trefoil.)
Trifolium filiforme, - - (Slender Trefoil.)
Medicago lupulina - - - (Black Medic, or Nonsuch.)*
Vicia sativa, - - - - - (Common Vetch.)
Poa patensis, - - t - - (Meadow Poa.)
Hog Peas,
Cabbage.
Anthoxanthum odoratum, - (Sweet-scented Spring Grass.)†
Poa pratensis, - - - - (Meadow poa.)
Dactylis glomerata, - - - (Round-headed Cock's-Foot.)‡

Chalk.

Hedysarum onobrychis, - - (Saintfoin.)
Trifolium procumbens, - - (Hop Trefoil.)
Poterium, - - - - - - - (Burnet.)
Trifoliumo chroleachum. - (Sulphur-coloured Trefoil.)§
Phleum Alpinum, - - - (Alpine Cats-Tail.)
Trifolium scabrum, - - - (Rough Trefoil.)
Anthyllis vulneraria. - - (Common Kidney Vetch.)

* I have seen this grow six years together, without any dressing, or a very trifling one.

† Excellent in clayey loams. ‡ Excellent for an early cutting.

§ On hills.

Gravel.

Trifolium procumbens, - (Hop Trefoil.)
Trifolium medium. - - - (Cow Grass.)

Sandy Soil.

Medicago sativa, - - - - (Lucern.*)
Trifolium pratense, - - - (Perennial Clover.)
Trifolium officinale, - - (Melilot Trefoil.)
Medicago lupulina, - - - (Nonsuch.)
Lotus corniculatus. - - - (Common Bird's-Foot Trefoil.)
Plantago lanceolata, - - - (Rib-Wort Plantain.)
Poa trivialis, - - - - - (Common rough-stalked Meadow-Grass.†)
Thymus, - - - - - - - (Wild Thyme.)

Loamy Soil.

Trifolium pratense, - - - (Perennial Clover.)
Trifolium repens, - - - (White Dutch Clover.)
And many others.

Very Wet Soils.

Avena pratensis, - - - - (Meadow Oat Grass.)
Medicago falcata, - - - (Yellow Medic.‡)
Festuca fluitans, - - - - (Floating Fescue.)
Festuca elatior, - - - - (Tall Fescue Grass.)
Trifolium glomeratum, - (Round-headed Trefoil.)
Grows very full, near wet ground.
Euphrasia officinalis, - - (Officinal Eyebright.§)

* A trial made in planting lucern in tolerably rich ground, and on poor sand, an equal quantity of manure to both. The first yielded of profit - - - - - - - - - - - - - - - - - - £6 4 4
The sand - - - - - - - - - - - - - - - - - - 11 5 6

† Though the cattle do not love the leaves, if the *least old*, yet they are very fond of the *seeds*, and they are very flourishing.

‡ Admirable in most soils.

§ I saw a field covered with this, and one the festuca, and they yielded prodigiously.

Very Dry Soils.

Trifolium albidum. - - - (White Siberian Melilot.)*
Anthyllis vulneraria. - - (Common Kidney Vetch.)
Alchemilla vulgaris, - - (Common Ladies' Mantle.)†
Ajuga reptans. - - - - (Common Bugle.)‡
Hedysarum, - - - - - (Saintfoin.)

It is a great pity we do not try the *trifolium maritimum*, which all cattle like, and which, if the seeds are raked on the sand in salt marshes, will soon spread themselves all around.

This is but a poor collection; but I am trying each in its own soil, as carefully compounded as I can; and I hope, if the idea should strike as *just*, I shall be able, in most agricultural vegetables, to select sufficient for the farmer, as to save all laborious parts of the trial.

Let me not be supposed to say, that each plant will only grow in their original soil; they will most of them live, but they will often fail, get *disordered*, and *degenerate*. It is in this way that grass land grows accustomed to its soil, though adverse; but a year or two is not sufficient to reconcile the plant to the soil.

I am, Sir, your obliged humble servant.

AGNES IBBETSON.

* Admirable in dry sand, if tolerably deep; will spread, as Miller says, without cultivation, if the sand be above a foot deep.

† Spreads excessively.

‡ Very cooling for cattle, and excellent summer food.

The first part of this letter was written more than a year preceding the present time. The trials I have since made have so completely confirmed the necessity of placing each plant in its own proper soil, that the matter will no longer bear a doubt by those who deeply study the subject; for each plant is not only formed by its leaves for the soil in which it was intended to exist, but in the root also; and of course the manner of taking in its nutriment is completely adapted for that soil. Thus, a sand plant takes the greatest part of its nutriment from the atmosphere; it is therefore loaded with hairs of various shapes and figures, which, receiving their juices from the dews, &c. prepare theirs according to chemical affinity, and then permit them (as soon as completed) to run from the hairs into the plant; while the roots (which are often thick and large, but which have very few *radicles*) are almost incapable of taking nourishment from the earth, and therefore the plant depends almost wholly on the exposure to the heavens; and it is on that account peculiarly necessary for these plants, that *aspect* should be most strictly attended to, and that they should be so placed as to face the east or south-east, receiving the morning and evening dew, and not too much exposed, and dried up the rest of

the day. To these plants the soil or earth is of infinitely less consequence, than the aspect; and throwing away loads of manure is really expending money without cause or effect; since it will be of little use, except warming the ground, which assists most plants, but to do which only a small quantity of dung is necessary.

For clay plants, which take in less nourishment, from their leaves, indeed scarcely *one-fourth* how different should be the provision the farmer makes for them. The root is formed with quantities of radicles, but all set close round: manure is here, therefore, of great use, if properly adapted; and labour, of still more. No ground costs so much as clay, which should *by rights* be considered in the lease; since to divide, pulverize, and dry, is the principal business of the farmer in clayey ground. Aspect signifies *nothing*, but a summer fallow will always be of admirable service. The root is loaded with radicles, but all close to the spreading part of the root; as the radicles of clay plants seldom like to run to a great distance, for fear of being cut off by the cracking of the clay.

The chalk plant takes much of its nutriment from the earth; this depends chiefly on soil; and adding sand to chalk is often as serviceable as manure; and the being well pulverized and mixed with the sand, is of no little consequence.

Here again, therefore, much labour is required: nor is it of less use the ascertaining what sort of chalk it is; some are infinitely more fitted for agriculture than others; some lime-stone or gypsum require only sand to make an admirable mixture; some absolutely require dung to be added to the sand to ameliorate the whole.

The water and semi-water plants require *water only*, as food; they take none from their leaves, but having their roots made for the purpose of inhaling water all day, and closing the pipes at night. These, of course, should be placed in very wet soils; and what a pity it is, we do not make use of the *festuca fluitans* in our swampy fields, when *too wet* for common pasture, and where it grows coarse and bad. Then once planting this grass, it would continue to come up each year: it is admirable for food; makes excellent bread, infinitely better than any thing I know, (except the finest wheat;) is good for gruel, and would grow in fields too wet for any corn or good grass. Horses are so fond of it they will half drown themselves to find it; it is particularly good in salt-marshes, but grows well in fresh. The *festuca elatior*, which yields still more in fresh water fields, is admirable for grass, though it yields *no seeds*: it is indeed an hybride; but it gives a quantity of admirable grass, which horses will eat, and are extremely

fond of; and a very early crop may be had, fit to be cut the end of April. The only disadvantage is, that it cannot be cut without dry weather; or the swampy ground is apt to hurt the men, and destroy much grass.

How necessary is all this knowledge to farmers! What a contrast is the mountain and rock plant! instead of taking its food from water, as in the last-named plants, it is wholly fed by its leaves; having no impervious skin, (which covers every other plant,) its open pores receive all the juices the atmosphere will bestow. They are so formed, as to take no nutriment whatever from their roots, except what just suffices to form their seeds: the quantity they take in at their leaves is so great, that if the field is on a high mountain, and is well examined with a microscope, even at noon, the plants will almost always be found bathed in dew: many of the clovers, also, are mountain and rock plants, and take in all their nourishment at their leaves, and are constantly seen immersed in dew.

Of what use, then, is manure to such plants? It is throwing away money to expend it, when, in other parts of the farm it might be so serviceable: would not this knowledge, so easily acquired, be of the utmost use to both farmer and gardener? So few are the agricultural plants, that rules for this purpose could be most

easily given. But let me not be *misunderstood;* in very poor ground, it is necessary first to bring it from that *sick state* to a *better;* every ground requires some good manure; and this is particularly the case, when exhausted and neglected for many years. Then manuring is the best means to restore it to a healthy situation; and till it has got back to its usual state, it must be treated accordingly. For through sand plants take little from their root, yet that little is a rich part, and requires, therefore, *healthy juices*; which, when the ground is sick and poor, it cannot yield. All this will be made most plain, as well as enforce my first principle, by the detail of the manner of laying down very poor land for grass, which has lately been most admirably exemplified on an estate belonging to a friend of mine, bought for a song, and on which I persuaded him to try the experiment. It was supposed, no vegetable, corn, or grass, would grow in it; indeed, this was the first pleasing intelligence he received from his neighbours. Assured that the matter would succeed, from having repeatedly tried it, I pressed him to manage it in my way, treating his ground like a sick animal, and giving it plenty of wholesome nutricious food; but leaving to nature to bring up the proper grasses, nor counteract her in any way. At first, nothing was to be seen, but the

poorest tribe of plants; *agrostis pallidor et canina*,* *festuca bromoides*,† tuft of the *galium uliginosum*,‡ and *galium aparine*, or goose grass. Hawkweeds, wild carrots, and all the sandy plants common to a very poor, light soil; for the soil was sand, with a bottom of yellow stiff clay. I then persuaded him to thoroughly plough the ground *very deep*, mixing the clay and sand very thoroughly together; and over the whole throwing a good dressing of dung. The next year, the *agrostis* had disappeared, the wild carrot also; the *sherardia*,§ chamomile, and rib plantain, were discovered in their stead. *Bromus mollis*, *asperula odorata*, *agrostis littoralis*,‖ and *festuca duriuscula*.¶ The next year the land received a top-dressing of a little dung, but a good quantity of earth taken from a ditch, with lime. I examined the grass before it was cut, and with delight saw a quantity of cow grass or *trifolium pratense*; some excellent *bromi*; *festuca ovina*, in perfection, strong and thick; *medicago lupulina*, wild chamomile, rib plantain, &c. &c.; in short, some of the finest grasses a sand soil, in a high state of improvement, will give. Nor does it want any thing, to preserve it in its present state, but a top-dressing every other year

* Brown Bent. † Brome Fescue. ‡ Marsh Ladies' Bedstrew

§ Field Madder. ‖ Sea side Bent. ¶ Hard Fescue.

But this would not be sufficient to keep them in this high state of improvement, if they were not in their own soil: if it was a clay, or a gravel, it would be a totally different set of grasses that would come up, as I have experienced. Some people insist, it is the dung *that brings* the seeds; but this *cannot be* the case; or they would not be always fitted to the soil.

A gentleman consulted me what he should do with his ground, plagued as he was with the *tussilago*.* He had ploughed the whole five times, without effect. I only advised him to dress it thoroughly with dung; and then, the next spring, throw on a fine quantity of sand, for the soil was limestone. In two years after, repeating this again, he had not a plant of the *tussilago* left, though, for five years before, he had been labouring against it without effect: the dung killed the poor plant. Thus, the two principles I wish to enforce in this letter, are,—that the plant *should be suited to the soil*, if the farmer wishes to save himself the *expense* of making the soil suitable to the *plant*;—and secondly, that, in laying down grass, no plan is so good as that of continuing to manure, till the proper grasses (suitable to the soil, and fitted for that degree of cultivation) have established *themselves*. When this is once done, a very trifling

* Coltsfoot.

asssistance, every two or three years, will suffice to keep up the state of perfection in which the ground is placed; for when once the *good sorts* are *established, (in sand in particular,)* they require but *little manure.*

Of course, the example I have given can belong to grasses and clovers only, which are *natives*; but exotics require still more to be fitted for the soil in which they are placed; since it is better to have to struggle against climate only, than against climate and soil also.

I received your letter so late, being from home, I have had but a day to answer it, and have not my books with me, but hope to add much to the subject in my next.

I am, with the utmost respect,

Your obliged servant,

AGNES IBBETSON.

Article VIII.

On the Probability of cultivating to Advantage the Marine Pea, and some other of the leguminous Class of Vegetables, on the Sea Shores of Great-Britain and Ireland.

[By John Sherwen, M. D.]

THERE is a fact recorded and established by the concurring testimony of so many of our ancient writers, as to leave not the smallest doubt respecting its authenticity; a fact, from which may be deduced inferences of great importance to the agricultural interests of the country. Viewing it in this light, I should think myself a negligent member of the Society, were I not to call its attention to the subject.

It is recorded in Stowe's Chronicle, that "In the moneth of August, (anno 1555,) in "Suffolcke, at a place by the sea side, all of hard "stone and pibble, called in those parts a shelfe, "lying between the townes of Orford and Ald-"borough, where never grew grasse, nor any "earth was ever seene, there chanced in this "barren place *suddenly to spring up*, without "any tillage or sowing, great abundance of

" peason, wherof the poore gathered (as men " judged) above an hundred quarters, yet re- " mained some ripe, and some blossoming, as " many as ever there were before; to the which " place rode the Bishop of Norwich, the L. " Willoughby, with others in great number, who " found nothing but hard rocky stone the space " of three yards under the rootes of those peason, " which rootes were great and long, and very " sweet," &c.

The same fact is mentioned by Sir R. Baker, in his Chronicle, page 346, ed. 1660. But we have a fuller and more particular account in the " the Booke of Simples," written by an eminent physician and scholar, the learned Dr. William Bullein, whose description may possibly lead to a discovery of the exact species. His account is as follows: "Anno Salutis 1555, in a place " called Orford, in Suffolcke, stones betweene " the haven and the main sea, there did pease " growe upon clusters, like the chattes or kaies " of ashe trees, bigger than fitches, and lesse " than the field peason, *very sweet to eat upon*, and " served many poore people, dwelling there " at hand; whiche els would have perished for " hunger, the skace of bread that yere was so " skal. in so muche that the plain poor people " did make very much of akornes; and a sick- " nesse of a strong fever did sore molest the

"comons this yere, as none was ever hard of "there. Now, whether thoccasion of these "peason and providence of GOD cam through "some shipwrake, with moche miserie, or els "by *miracle*, I am not able to determine "therof; but sowen by man's hand they were "not, nor like other pease."

As far as I have had opportunities of examining, not one of the historians, by whom the fact is recorded, have dropped the slightest hint respecting the probability of turning this accidental discovery to the benefit of mankind. Even the enlightened mind of Camden was satisfied by merely stating the fact, and disproving its pretensions to miracle; nor did it make any other impression on that of the Right Reverend Bishop Gibson, his continuator. "When, in "the year 1555, all the corn throughout Eng-"land was blasted, the inhabitants tell you, that, "in the beginning of autumn, there grew pease, "*miraculously*, among the rocks, without any "earth about them, and that they relieved the "dearth in those parts. But the more thinking "people affirm, that pulse cast upon the shore "by shipwreck used to grow there now and "then; and so the miracle is lost. But that "such as these grew every year among the "pebbles on the coast of Kent, we have ob-"served before; [and a later writer saith, that

"at the south part of the Meer-shingle, there "still come up yearly certain coarse grey pease, "and very good coleworts, out of the stony "heaps."]*

Ray, in his *Catalogus Plantarum Angliæ*, p. 244 and 5, has a long article on these peas, and considers them merely as an uncommon profusion of the English sea pea, the *pisum maritimum Britannicum* of Parkinson, or the *marinum* of Gerard. He says, they grow on other parts of the sea shore, in stony and sandy situations, *in maris littore arenoso et saxoso*, viz. not far from the town of Hastings.‡ He tells us that the fact which I have quoted from Stow, was first related by Gesner in an epistle to Dr. Caius; and that the words of Gesner are, that the produce was so great as to supply even *thousands* of men, *vel millibus hominum.* Ray, like Camden, is satisfied with rejecting the miracle; and adds, that nobody would willingly make use of them as food, unless urged by hunger and want of better aliment, *certe nisi urgente fame et in melioris alimenti inopia.* He totally rejects the opinion, that the abundant crop arose from seed scattered by tempests and shipwreck;

* See Gibson's edition of Camden's Britannia, vol. i. p. 447.

‡ *Query.* Is the early pea, with which our markets are so well supplied in summer, under the name of Green Hastings, a cultivated variety of the sea pea?

and he, like every other relator of the fact, is silent respecting the obligation, imposed upon every friend to agriculture, of improving the hint, which may with the strictest propriety be deemed a providential one, although hitherto never acted upon.

I am well assured that the Society which I have now the honour to address, is too ardent in its pursuits, and too zealous in its endeavours for the benefit of mankind, to permit a fact so well substantiated, either to be passed over with indifference, as a mere matter of curiosity, or to remain any longer buried in the darkness of black-letter chronicles and books of physic. It is, indeed, impossible to reflect on this fact, which seems well authenticated, without deeming it highly probable, that there is *one at least* of the leguminous class of plants, the seeds of which will retain their vegetating property after frequent and long immersion and maceration in sea water; and that they will not only vegetate under such circumstances, but thrive and produce abundance where, previous to this fortunate observation, no other esculent plant has been seen to grow, colewort excepted.

Doctor William Bullein was a professed botanical writer; he resided at that period in Suffolk; and it is evident that he must have been an eye-witness of the extraordinary vegetation,

from his particular description. He says, they had roots two fathoms long, and were not like other peas. He, as a botanist, one would imagine, could not have been a stranger to the common maritime pea growing in his own neighbourhood. There is some reason, therefore, to suspect that the species now under our consideration might not have been that alluded to by the conjectures of Camden and Ray, who never saw them. If they were of a different kind, the exact species can now only be brought to light by the aid of experiment; and I am persuaded that this Society will deem it advisable to substitute, instead of some which are now obsolete, a prize for the best conducted experiment, made with a view to discover if any of the other legumina, which we now possess, will vegetate in similar situations. I am sanguine enough to hope that *many of them* may be found possessing the like property; since it is well known that plants, nearly allied in botanical character, generally affect a similar mode of culture.

The experiment which I would recommend is plain and simple. Let a mixture of every known seed of the leguminous plants be scattered in situations resembling that at Orford or Aldborough; and it is possible that we may hereafter behold several of them taking root, and flourishing with the same vigour as the common

sea pea. If the experiment totally fail, and we be compelled at last to admit the judgement of Ray to be correct, viz. that the astonishing crop of 1555 was really nothing more than a profusion of the English sea peas, why not adopt them as an article of cultivation? by means of which "*the unnumbered idle pebbles*" on our sea shores, where "never grasse grew, nor any earth was "seen," and which have been hitherto consigned to perpetual sterility, may hereafter be clothed with verdure and vegetation, producing plenty of sustenance for sheep and oxen, if not immediately for man.

Whoever undertakes the experiment will doubtless recollect, that, on the testimony of Bishop Gibson, very good coleworts will grow out of the same stony heaps. It would, therefore, be advisable to throw in the seeds of that plant at the same time.

If the experiment here suggested should succeed, it will probably occur to every member of this Society, that there are many acres of pebbles on the sides of our lakes and rivers in the interior parts of the country, in which, with still greater prospect of success, a similar cultivation may be attempted, so that flocks of sheep may hereafter be made, by the art and industry of man, to fatten almost upon heaps of stones.

Since this paper was drawn up, I find, in the first number of that superb and valuable publication, the Continuation of the late Mr. Curtis's Flora Londinensis, the *pisum maritimum* elegantly and accurately described, and recommended to the notice of agriculturists. I sincerely hope the good intentions of the writer will be warmly seconded by the exertions and influence of the Bath and West of England Society for the promotion and improvement of Agriculture.

J. S.

P. S. The marine pea, being a perennial plant, maintains its situation wherever it obtains possession; and on this account, its cultivation becomes an object of still greater importance; for the extensive growth which either first took place, or was first noticed, in the year 1555, on the Sussex coast, still flourishes there, affording an annual supply of green nutritive food for sheep and oxen.

Article IX.

A Treatise or Essay on a Disease, commonly called the Quarter Evil, *incident to young Cattle.*

THIS disease is nothing less than a morbid virulent gangrene, or mortification, which generally takes place in one of the four quarters of the animal, and thus creates the name or appellation of the Quarter Evil.

It is a disease handed down from time immemorial, for which there never did exist a remedy or cure, and therefore ever has been considered mortal. There is something melancholy in the idea of having cattle so frequently visited by this calamitous disorder, after having fostered them with so much care, and thus far reared up. They fall a sacrifice to this cruel disease, which bids defiance to every known remedy, and ends in certain death; and, indeed, where there exists a deep and rapid mortification, what is to be done to prevent death?

It is a truism, beyond all question or doubt, that a certain and sure preventive of this distemper is the only effectual cure, and this small tract is avowedly drawn up for the sole purpose of pointing out this desirable and salutary end. I am apprehensive that the quarter evil sweeps away more young cattle, in those districts where the disease is prevalent, than all the other disorders they are liable to, ten times over; and its fatal effects I know have been ruinous, and have blighted the prospects of many an industrious breeder of cattle. I have all reason to believe that the western counties of this kingdom are visited with it more than any others, and it is scarcely to be doubted, but that a peculiar herbage and current of air contribute much, with other contingent causes, to promote the disorder in question; young cattle feeding in salt-marshes, or near the sea cost, where they breathe saline air, are seldom visited with the distemper; and this is accounted for, by the air and herbage contributing so essentially towards keeping the blood in a thin and proper state of circulation.

Young cattle are generally attacked with this disorder, from nine to twelve months old; I have known instances of their dying at two, and even three years old, with it; but the latter seldom happens. It is well known to all breeders, on inclosed farms, that, from ten to fifteen

months old, young beasts are naturally so indolent, sedentary, and inactive, as not to take sufficient exercise to keep the blood in a proper state of circulation, and to this may be ascribed the consequence that follows: their blood (which naturally increases as they grow) becomes very thick, black, and sluggishly passes through the smaller blood vessels, and they become overcharged, and consequently, circulation is, at length, much impeded and obstructed; and finally stopped in those minute vessels; a disposition for immediate inflammation, surrounds the stagnant part, and quickly ends in mortification; and those symptoms, when they once take place, succeed each other so rapidly, that the disease frequently carries off its victim in a few hours. A swelling shews externallythe mortified part, which, when struck, sounds like strained parchment, when opened, it resembles a black spongy flesh, and has a most terrific appearance.

I have myself had upwards of twenty young beasts killed, immediately upon their being visited with this distemper, in order, if possible, to ascertain its original cause, and thereby endeavour to find some remedy, or method, to counteract or prevent the fatal consequences. The result of all these experiments was decidedly convincing, that the seeds and embryo of this disorder first take their seat in the blood, and

begin and bespeak its character in the minuter blood vessels, as before stated.

This indolent and sedentary habit in young calves has been endeavoured to be prevented, by some breeders, by placing them with older cattle, as by them they are frequently butted in their pastures; this may create some additional exercise, but its benefit must be of very little worth. Others have had rowels or setons introduced in the bosom, and other parts of the beast; but they soon dry up, and indeed contribute nothing to purify the mass of blood, or to accelerate circulation, the most essential, and indeed the only, thing wanted.

In the year 1806, I weaned thirteen calves, (twelve heifer calves, and one bull,) eight of the heifer calves died of the quarter evil, before they reached twelve months old; and the bull died, when about eighteen months old, in the same disease. An experienced cow farrier was called in, medicines and drenches were administered, during the time of their falling into the disease; but every method to prevent the disorder proved fruitless. The price of cattle was at this period very high, and it is not too much to say, that those purchased to replace those that were lost cost from twenty guineas to twenty-five pounds each, at three years old.

I have here to observe, that it is very improper to change the pasturage of young beasts after weaning. They should summer graze upon old grass land, and be fed with old hay during winter. I knew a breeder, some few years ago, change the depasture of a very fine shew of young cattle, from old grass to that of a rich piece of eddish or after-grass; the result was, one half of them died of the quarter evil, before Christmas. This is a convincing proof to me, that the new grass had the effect of making the blood too rich, and become too thick, which contributes to bring on the disorder.

In 1813, I had weaned, upon my farm, twelve heifer calves, and one bull, (I was then in possession of the remedy which I now use as a preventive). About old Michaelmas day, I had them taken into a pen in the evening, and kept them fasting all night; and the next day had them bled; and after bleeding, gave them the prescription hereinafter to be named.

In bleeding these young cattle, I observed that their blood was in general very thick and black, and soon coagulated; and from one in particular very little could be taken at all. At the end of four days, after the whole were drenched and bled, I had them taken in, and that one bled again, from which little could be taken before: on being struck with the fleam, he bled most freely,

the colour of the blood was vivid and thin, which proves, what a powerful effect the remedy has upon the blood. I have not the smallest doubt, that if nothing had been done to prevent it, one half of these would have died with the quarter evil, before winter was over. They are now twelve beautiful heifers, and all in calf. I never heard, or knew, but one instance, where a cure was effected, after the disease had actually taken place, and it was performed in the following manner. The disorder took its seat upon the loin, and a tumour immediately made its appearance, about the size of a large goose egg. The beast was instantly taken into a house, and a deep incision was made through the tumour, which was divided in two; upon opening, its appearance was a black, spongy, mortified substance. It was then cut through to the quick, or sound part, and a large handful of salt was immediately applied, and worked into the morbid part; and a large glass of French brandy was also poured in. This subdued the mortification, (it being only external); after some few hours, the orifice was sewed up, leaving a string by way of seton; it took to work, and the beast did well, and is now alive. I suggested the idea, and performed the whole myself. It should, however, be noticed, the application

was made at the critical moment, for had it been attempted a quarter of an hour later, the mortification would, in all probability, have reached the kidnies, and the whole would have proved useless.

As it has been before urged, a *preventive* of this terrible disorder is alone the *only certain* cure, which desirable object is completely and effectually obtained, in the recipe hereto subjoined. It is both simple, and easily obtained, with little trouble and expense; its effects upon the blood are beyond all conception; and although I am some hundred pounds the worse for the quarter evil in my cattle, I am confident, (and it is a pleasure to me to say,) I am some hundreds the better, by being in possession of a remedy, that is calculated to prevent its terrible ravages.

I have, in this Essay, confined myself to plain simple facts; and I beg leave now to add, that what has been said concerning the causes and effects of the disorder in question, is from my own observations, the result of actual experience; theoretical notions are entirely avoided, as well as abstruse reasoning. I am fully aware, that it is unphilosophical to pronounce a specific or infallible remedy as a certain cure or preventive of any disorder; yet I verily believe, if the recipe here offered have a fair trial, and be

properly administered, it will have the effect of a sure and certain prevention of the disorder in question.

JOHN DOWDING.

Dodington, 28th March, 1815.

A Recipe for the Prevention of young Cattle from the Quarter Evil.

TAKE six quarts of *strong, stale, beef brine*; also six quarts of chamber lye; to this add six pints of dry hen-dung, (taken from where they roost under cover,) and one pound of powder of sulphur. This must be mixed together, and let the whole stand in a vessel for four days; then boil it together for an hour; then strain off the liquor, and give to each calf three half-pints of the mixture *luke-warm.*

N. B. The young cattle must be taken into a house the over-night, and kept *fasting* until ten o'clock the next morning, when they are to be bled, and there must be taken from each about sixteen or eighteen ounces of blood; and afterwards to be drenched, as above stated. The mixture must be increased in proportion to the quantity of calves, so that each may receive three half-pints of the strength above set forth.

ARTICLE X.

Copy of a letter from the Hon. Richard Peters, President of the Society of Agriculture, in Pennsylvania, in North America, to Sir Benj. Hobhouse, bart. M. P. President of the Bath and West of England Agricultural Society, accompanied by some American earths, and minerals, used as manure, with an analysis thereof; transmitted through the hands of Robt. Barclay, esq. To which is subjoined, an anlaysis of the same by Dr. Wilkinson, Chemical Professor to the Bath Society.

Belmont, near Philadelphia,

Oct. 10, 1815.

DEAR SIR,

IT is not through want of sensibility to your politeness, that I have not answered your very kind favour, transmitted by Mr. Barclay. I reciprocate, most sincerely, your personal good wishes; and join in an ardent hope, that a good understanding and mutual intercourse

of friendly offices, may long continue between our nations. Now the fiend, who was the tempter and destroyer of nations, is fallen, we may hope for halcyon days. His final catastrophe resembles the fall of his prototype.

> So, struck with dread and anguish, fell the fiend;
> And, to his *crew, that sat consulting*, brought
> Joyless triumphals of his hoped success,
> Ruin, and desperation, and dismay. *Milton.*

Yet he has left behind him the stormy passions of his votaries, which will, *ever and anon*, break forth. And the watchmen, who are placed to guard the freedom and happiness of the civilized world, should never sleep.

On the old principle, *communiter bona profundere deum est*, I transmit to you specimens of a mineral manure, first discovered *(among us)* in the state of New Jersey, which has produced the most wonderful change in the agriculture of a steril country, that even a warm imagination could anticipate. I had heard so much of its effects, that I made a little tour last summer into the scene of its operations; and was both surprised and convinced. Late barren fields clad with the richest verdure,—heretofore miserable farms converted into gardens,—risen in their value from ten dollars to two hundred per acre, (the purchase of the fee-simple,)—and their possessors emerged from poverty to wealth and comfort!

I have seen white clover, by means of this manure alone, on a steril sand, knee deep, without a seed sown.* I think the effects of this manure put to flight the idea that calcareous substances are necessary to vegetation; for in the most operative of the species of this substance, no effervescence can be produced by the strongest acids; nor is there any thing calcareous, either in the manure, or in the sandy soils, on which it produces the most luxuriant crops. Yet many specimens will effervesce, but the calcareous matter is foreign. I have seen among some of the manure whole oysters, lobsters, skeletons of fish, teeth of fish innumerable; so that I have no doubt but that the whole region in which it is found, has been once covered by the ocean. I think I have heard lately of some mineral substance used advantageously in some of *your* seaboard country. *Iron* pervades most of the solid substances in nature. It is, of itself, hostile to vegetation; but its oxydes, mixed with other matter, have been long known to operate favourably on soils. Whether the discovery of this substance originated among us, or with you, is immaterial; and the inquiry would only gratify a *petty* pride. But, I believe, it has not been extensively used by your agriculturists. I send

* No tests produced any appearances of calcareous matter in the manure or the soil.

the specimens for comparison with any you have; and the facts relating to them to stimulate further experiments and explorations. I have promises from several chemists to give me analyses of this substance. The sulphur and iron are prominently perceptible. I repeat my old assertion, that I never saw any earth in which sulphur abounded, which was not a manure. A great proportion of *alum* is also found in many pits. Some of it (the manure) is granulated, and looks like green vitriol. There are great varieties, whereof I have only sent a few. It seems to be most operative on light soils. It comes from the pits generally in lumps, and seldom in powder. We always suffer it to lie through a winter, that the frosts may decompose and pulverize it; or, as the country people say, *tame it;* for it is really ferocious, if applied immediately out of the pit. And I think it is best at first used as a top-dressing, and, after a season or two, ploughed in for grain crops. I mixed, this season, a small quantity with the earth in which I planted the seed for six rows of Indian corn. Other six rows adjacent I top-dressed with a like quantity. Not a seed of the first threw up any vegetation *above ground*, whilst those top-dressed are among the best in the field. I perceived the tender radicles and plumulæ of the first-mentioned to be burnt

and completely destroyed, before the coronal roots could be formed.

I enclose an extract of a letter from a sensible farmer, who has a pit on his farm. It will serve to assist you in any explorations you may choose to set on foot. You can expect no more than a plain account from such a character. Many of our landholders are very intelligent, as such a *tourist* as your Mr. Birkbeck would discover. The loose earth in the box Mr. Reeve calls *pseudo-marl*, and chiefly consists of the cover of genuine manure. Yet I have tried it; and though it requires greater quantities, it operates favourably. There is ferruginous *clay* in some pits, fertilizing to *sandy* soils.

I have a promise of an essay on this subject, from a literary character, chemical, mineralogical, and agricultural. If he perform his promise, I will send you a copy.

If the subject of this communication should not be so useful to you as we experience it to be to us, it will, nevertheless, evince the disposition I feel to meet the very polite attentions of your Society. It also gives me the gratifying opportunity of assuring *you* of the respectful consideration with which I am, with sincere esteem,

Your very obedient servant,

RICHARD PETERS.

Some of our chemists find a small proportion of *lime*, others none. They all agree that *lime* is not a constituent part of the genuine original manure. Some find *sulphur* in great proportion; others only sulphurated hydrogen. All discover iron and aluminous clay, mixed with silex in some samples. Nine of them have completed their analyses, and have operated on different samples. Set your chemists at work. All agree that *marl* is, of all others, the most unappropriate appellation.

Sir B. Hobhouse, bart.

Extract of a letter from Mr. Mark Reeve, of Evesham, New Jersey, to the Hon. R. Peters, Sept. 20, 1815.

[Jersey Mineral Manure.]

THE substance, whereof an account is given, is according to common phraseology in Jersey, called *marl* by the writer: yet, the best of it has no calcareous matter. In some specimens, a small proportion of *lime* has been discovered. But this is found, where shells,

fish-bones, or other marine animal matter, have mixed with the mass. It should be called by some other name.

The letter gives a topographical description of the places wherein the *marl* (I must use that name) is discovered, in quantities inexhaustible. It is generally found on alluvial grounds; sandy or micaceous loam, under beds or strata of iron ore, in boggy or wet places. Sometimes in dry banks; but always mixed with ferruginous substances; and, without exception, impregnated with sulphur and alum. It has been discovered in all our seaboard countries, in Delaware, Maryland, and Virginia; but the use of it, is yet (except in Jersey) in its infancy. The writer mentions sundry places in which it is found; and adds, "although the quantity of *marl* in "Jersey is immense, yet there are but few "natural situations that the best kinds can be "taken from, with advantage, on account of "the great body of earth found on it in general, "and from the wet situation of it in other places." One species only, the isinglass, is on Navigation, according to our present knowledge of it; but enough for all purposes of agriculture can be had within a moderate distance of navigable waters. In the interior of the flat country it is every where found; but never on high lands.

" The use of *marl* as a manure, was first dis-
" covered by hauling it away from around wells,
" (the water whereof is always injured by it,)
" and throwing it down in some by-place; and
" afterwards, observing the astonishing growth
" of vegetables around the spot. Trees that
" grow on land that has marl within a few feet
" of its surface, when blown up, have their roots
" flat at the bottom; they not entering the
" marl. For we don't find the roots of any ve-
" getable in marl of a strong kind, as it lies in
" its natural bed. Probably, it requires an ex-
" posure to the atmosphere, to fit it for promo-
" ting vegetation; and it is also remarkable,
" that no worm or reptile whatever is ever found
" in marl. The water which runs in many
" species of marl, particularly the *gunpowder*,
" and the black, hard kinds, is strongly im-
" pregnated with *iron*, leaving a tinge of the
" oxyd of iron on whatever it runs over. All
" the marls, after a few days exposure to the
" air, in dry weather, have a white frosty ap-
" pearance on the surface, many of which have
" an aluminous taste, but some not so. The
" depth or thickness of the strata of marl, at
" present, is not much known; there having
" been but few instances of going through it.
" Some of the marl lies very compact, and too
" hard to spit up with the spade; others more

" loose, particularly the gunpowder kind, which " will spit up very readily : and after getting " down into the springs, the marl will run into the " pit, like quicksand. At some places, the upper " surface of the marl is nearly level, for some " distance; the inequalities of the ground, be- " ing occasioned by a greater quantity of earth " brought on it. But we find other instances " of the marl rising and falling with the surface " of the ground, so as to have very much an " uniform thickness of earth on it. There are " large meadows of several hundred acres to- " gether, in which, the marl is only covered with " a soil from six to eighteen inches; and with " an iron ore, called iron stone, from a few " inches to two feet thick. And where the marl " lies near the surface, in wet situations, there " is, generally, an iron stone crust on it, parti- " cularly the gunpowder, and the hard marl " kinds. The water which runs from good " marl, or that stands in the pits, never settles " quite clear; but remains a pale milky white, " or a light sky blue colour; and in the neigh- " bourhood of the marl, where we observe that " colour in the small streams, we find good mea- " dow thereon; for, it is probable, those mea- " dows owe the principal part of their fertility " to the marly nature of the water which over- flows them at times; and it has been proved,

" that water from a marl pit has all the good
" effects of marl on grass grounds. Its good
" effects have been known to last fourteen or
" twelve years. Beyond that time, little can
" be said; as it has not been used but a few
" years. In one instance, ten years after the
" first dressing, it was repeated; and it had all
" the good effects of the first dressing, which
" were very great. One of my neighbours has
" gone over some of his land the third time, with
" good success. Its good effects are observed in
" top-dressing on grass lands, Indian corn, pota-
" toes, and all kinds of garden vegetables, and for
" fruit-trees. A few years after a top-dressing
" of the sod is ploughed in, a good crop of any
" thing may be obtained. Some use it with
" good success, mixed with yard manure, by
" way of compost, on land for wheat or rye.
" But I prefer it as a top-dressing; believing
" the atmosphere decomposes it, and fits it for
" vegetable purposes. The quantity per acre
" may be from *three* to *ten* and *twenty* tons;
" but great effects have been observed, the two
" last years past, on grass lands, from one to
" two tons per acre, strewed over by hand early
" in the spring. There are appearances of ma-
" rine substances in several species of marl; and
" lumps of a metallic kind of ore are found in
" the different kinds; but no silicious stones,

" or gravel, are found, except in one sample which
" I have sent, (*No.* 20.) The real, genuine marl
" I suppose to be those black and green particles
" resembling grains of gunpowder. I have made
" use of a very simple method of ascertaining the
" goodness of marl: put some of it in a glass,
" and wash it repeatedly, until the water comes
" off clear; then, by a magnifying glass, the
" proportion of sand may be discovered: per-
" haps that part which is washed away, may be
" as valuable as any part of it; for grains of
" marl pulverized, and put in water, give to the
" water the same appearance, as that part does
" which is washed away; but I have estimated
" the value of it by the greater proportion of
" those grains which I find in it. We are, as
" yet, ignorant as to what part, or what there is
" in marl, which has such great effects. I have
" supposed, that some marls act only from the
" *sulphuric acid* which they contain; and that
" others act in a double manner, by that, and
" some other substance contained therein. Some
" of us have an idea, that those marls which
" act the quickest, are of shorter duration in
" their effects; but that is yet to prove. Those
" iron ores which cover the marl, that pulve-
" rize with the winter, have so much of the marly
" nature in them, as to have much the same
" effects on some lands. In many places there is

" a stratum of *fuller's earth* over the marl,
" from one to four feet in thickness; and, in one
" place, a stratum between two strata of marl.
" The effects of the fuller's earth on *some*
" lands nearly equal the marl. This stra-
" tum of earth is commonly divided off by
" separations, a few inches from each other;
" and falls, when digging, into many square,
" irregular pieces; and those division lines
" are generally tinged with the oxyd of
" iron. This earth is generally, more or less,
" sulphurous. Also, in many places, over the
" marl, there is a stratum of a brown grey mix-
" ture, very tough, and hard to dig, and from
" two to six feet in thickness. The owners of
" some marl banks oblige the purchasers to
" take that stuff with the marl, and to stran-
" gers it may be put off as such: it contains
" little or no marl, and is of little worth. In
" some of the hard marl and gunpowder
" kinds are small indigo specks, of about the
" size of a pin's head. One bushel,* struck
" measure, of dry gunpowder marl weighs 102
" pounds. All the species have a tendency to
" loosen and mellow the soil; and give to grass
" a beautiful green. Cattle prefer feeding on
" that part of a pasture that has been marled.
" The effects of it on some of our poor thin

* Winchester.

"meadows are extraordinary; destroying In-
"dian grass, moss, and other pests; and, in
"their places, bring on a good crop of white
"clover, and other good grasses. So that, had
"we the power of creation, we could not have
"hit upon a substance to answer our purpose
"more completely than this, as it will destroy
"the useless, and, in their places, bring on
"good grasses, without further trouble or ex-
"pense. In the different veins, there are a
"variety of shades and mixtures; but the diffe-
"rent veins have each their general character-
"istic appearance, to know them by. We
"never find the gunpowder marl, in the ising-
"glass (*mica*) vein. Neither do we find this
"micaceous appearance in the gunpowder, or
"hard veins. We find the best marl on or
"near the middle of the gunpowder vein; that
"on either edge being more sandy, and some of
"it, but little worth; although, upon slight ex-
"amination, little difference would be observed.
"Perhaps, at some future time, the use of this
"marl will not altogether, be confined to ma-
"nure: for, in the different species, there are
"the materials for manufacturing *sulphur*,
"*alum*, and *copperass*."

DEAR SIR, *October* 24, 1815.

The two following are the only accounts of the mineral manure received from chemists. I shall obtain more perfect analyses in due time. I send these to throw some light on the subject; but shall, ere long, be enabled to give a more correct statement, both of the component parts and agricultural facts.—I repeat assurances of respectful esteem.

RICHARD PETERS.

Sir B. Hobhouse, bart.

DEAR SIR, *October* 17, 1815.

I have examined the specimens of supposed *marl* from Jersey, but having here no means of analysis, or time for the purpose, I can ascertain no proportions.

It is not properly or technically a *marl;* it would be much more properly called a *pyritous earth.* It contains,

1. Sulphat of iron, and hydrat of iron, from decomposed martial pyrites.

2. Vegetable matter, charred or carbonized by the action of the iron contained in it.

3. A small quantity of aluminous or argillaceous earth.

4. A small quantity of calcareous earth, from *decomposed shells.*

The sulphat of iron proceeds from decomposed pyrites. The hydrat of iron is the same with that which forms the substance of the *blue and green earths* of New Jersey.

Its fertilizing qualities proceed, as I think, chiefly from the iron contained in it; next from the vegetable matter.

I do not doubt about the general constituent parts, though I cannot pretend to accuracy without the opportunity of analyzing it.

I am, &c.

THOMAS COOPER,

Professor of Chemistry and Mineralogy.

Analysis made by J. Cloud, Melter and Refiner of the Mint of the United States.

1. The pulverized mineral did not effervesce with muriatic acid; consequently, there is no carbonate of lime.

2. A proportion of the mineral was lixiviated with river water, and the solution filtered with

muriat of barytes. With alcohol of galls it produced a deep black. These tests indicate the presence of sulphat of iron.

3. The mineral, after lixiviation, was submitted to the action of muriatic acid. The solution proved to contain iron. Hence we may infer, that the mineral contains iron, uncombined with sulphuric acid.

4. A portion of the lixiviated mineral was boiled in a solution of carbonate of potash, for the purpose of decomposing the sulphat of lime (if any), and afterwards freed from the alkali by washing. Muriatic acid was then tried; but no effervescence being produced, we may conclude that there is no sulphat of lime in the mineral.

5. On red hot iron it emitted a strong smell of sulphur.

Observations on the American Mineral Manures or Marls.

THESE letters have not been accompanied by any satisfactory geological account of the places where the different specimens have been taken from; and the name by which each specimen is designated appears to arise from local circumstances, and not from any property the earths present; all of them have a greenish

colour, varying a little in tint, in a fine dry pulverulent state; and very much the character of a siliceous sand. From the surprising accounts of their fertilizing quality, under certain conditions, viz. in their recent state as prejudicial, as after atmospheric exposure they are beneficial, to the different soils, to which they have been applied; it has been deemed, by the Society, an object desirable to be ascertained, what changes these earths undergo by such an exposure; this important circumstance cannot be obtained, as none of the earths in their recent state have accompanied the specimens sent to the Society.

Seven different specimens were sent in small boxes, inclosed in one of a larger size, at the bottom of which, a large portion of earth, of a character very much resembling those in the smaller boxes; and upon the covers of the boxes, the following names were affixed:

Isinglass, (covered by iron oxidated.)
Mark Reeves Pit.
Grey upper stratum.
Marked 20, (see the letter.)
Isinglass, under bog ore.
From the margin of a fordable stream.
Gunpowder.

A quantity of earth at the bottom of the box, unmarked.

Specific Gravities.

The dry and finely divided pulverulent condition in which all the specimens exist, rendered the ascertainment of their specific gravities very easy, viz. by weighing the same phial full of the different earths, marking their weights, and then determining the weight of a corresponding bulk of water; and for the conveniency of analysis, I attached to each box a number, which I subsequently employed, instead of repeating the above-mentioned inscriptions on each box.

No.	Grains.	Sp. G.
1 Isinglass, (covered by iron oxidated) - - - - -	189	1010
2 Mark Reeves Pit - - -	308	1593
3 Grey upper stratum - -	249	1278
4 Marked 20 on the box - -	260	1374
5 Isinglass, under bog ore -	200	1069
6 From the margin of a fordable stream - - - - -	260	1374
7 Gunpowder - - - - -	305	1630
8 At the bottom of the large box -	255	1363
9 The same bulk of water -	187	1000

All the earths were exposed to a sand heat, not exceeding 212 degrees, as water was preserved gently boiling, at the same time. By this degree of drying, 120 grains of each were

exposed, with a loss not exceeding one grain, in any of the specimens; a proof of the earth being principally siliceous, from so small a quantity of water being retained.

One hundred and twenty grains of each earth were separately boiled, for one hour, in six ounces of distilled water; when cool, the water was filtered, and each portion preserved distinct, and the undissolved portions were again exposed to the same sand heat as before, and when completely dried, the weight of each appeared as below:

No.	Before being put into water.	After being boiled.
1.	— 120 grains	— 116 grains
2.	— 120	— 116
3.	— 120	— 115
4.	— 120	— 116
5.	— 120	— 117
6.	— 120	— 114
7.	— 120	— 116
8.	— 120	— 116

Although the earths differ so materially as to their specific gravities, yet we find a great similarity in the proportionate part of each, soluble in water; after filtration, whatever was dissolved, produced no discoloration; and the water from each was examined by the following tests and reagents.

Chemical Examination of the filtered Water.

TESTS AND REAGENTS EMPLOYED.

Muriate of Barytes.	*Nitrate of Silver.*	*Oxalate of Ammonia.*
1. A cloudiness	Very little cloudiness	Very slight cloudiness
2. Ditto	Ditto	Ditto
3. Dense cloudiness	Ditto	Ditto
4. Ditto	Ditto	Ditto
5. Slight cloudiness	Ditto	No effect
6. Dense cloudiness	Ditto	Slight cloudiness
7. Gentle cloudiness	Ditto	Very trifling effect
8. Dense	Ditto	Ditto

Pure Ammonia.	*Carb. Ammonia.*	*Tinct. of Galls.*
1. No effect	Slight cloudiness	Very slight, after standing some time.
2. Ditto	Ditto	No effect
3. Solution greenish, rendered colourless by ammonia	Ditto	Ditto, after some time a little discoloured
4. No effect	Ditto	No effect
5. Ditto	Ditto	Ditto
6. Ditto	Ditto	Ditto
7. Ditto	Litto	Ditto
8. Ditto	Ditto	Ditto

Suc. Ammonia.	*Prussiate of Potass.*	*Litmus.*	*Turmeric.*
1. No effect	No change	No Change	No change
2. Ditto	Ditto	Ditto	Ditto
3. Ditto	Ditto	Ditto	Ditto
4. Ditto	Ditto	Ditto	Ditto
5. Ditto	Ditto	Ditto	Ditto
6. Ditto	A very gentle bluish tinge	Slightly reddish	Ditto
7. Ditto	No change	No change	Ditto
8. Ditto	Ditto	Ditto	Ditto

From these effects it would appear, that the water had dissolved a very minute portion of the sulphate of lime, and probably a small proportion of the muriate of the same earth, or else of soda. The very small change induced by the oxalate of ammonia proves that the proportionate quantity of lime taken up by the water must have been very minute. The effects produced by the carbonate of ammonia demonstrate the presence of lime, from its being precipitated in the form of a carbonate. That no magnesia is present, is evident from pure ammonia not occasioning any precipitation.

It does not appear from the effects of the tests for iron, that any of that substance exists in the earths in any state soluble in water; what occurred with No. 6, becoming of a slight blue, yet no precipitation took place after many days rest. From the appearance of the litmus in that solution, we must suspect the presence of some uncombined acid; and from the effect produced in this solution by the muriate of barytes, we might be induced to deem it sulphuric acid. As no one of the other solutions evinced any uncombined acid or alkali, this slight impregnation most probably originated from some circumstance I am not at present aware of. Upon boiling another portion of the same earth in distilled water, the same effects

were produced on the filtered solution by the afore mentioned tests.

In order to ascertain whether any lime or magnesia were present, I digested 120 grains of each of the earths in diluted muriatic acid, and for three days I filtered and well washed the earths, which, when dried as before, weighed the same.

Nitro-muriatic acid was affused on each portion, in a quantity equal to double the weight of the earths, and in all to a considerable excess; these were left in this state for a few days, and then gently evaporated to almost a state of dryness. Distilled water poured upon them, and after well washing the undissolved portions, and drying them at the same heat, they were found to weigh as below:

	Quantity remaining.	Quantity exposed.	Lots.
1.	100 grains	— 116 grains	— 16 grains
2.	103	— 116	— 13
3.	99	— 115	— 16
4.	97	— 116	— 19
5.	105	— 117	— 12
6.	101	— 114	— 13
7.	103	— 116	— 13
8.	108	— 116	— 8

A slight effervescence, after heat was employed, only took place. The nitro-muriated

solutions being gently dried, and the dried portions dissolved in distilled water, no traces of lime or of magnesia could be discovered. In the solution, the oxyd of iron was separated by the succinat of ammonia, and the precipitate boiled in an alkaline solution, to separate any portion of alumine precipitated with it, after being well washed, and dried in a platina tray at a red heat; and the proportion of the red oxide nearly corresponded to $\frac{1}{12}$ of what the nitro-muriatic acid had taken up, viz. in No. 1, $1\frac{1}{4}$ grain, the residue being deemed alumine and loss.

The insoluble part remaining after the filtration of the nitro-muriatic solution retained all the green colour, evincing some combination with the siliceous part, which the acids employed had not been capable of separating. To each portion was added four times the weight of the dry subcarbonate of soda, and exposed to a red heat in a silver crucible for half an hour: the whole was boiled in water, till completely detached from the crucible, and muriatic acid added to excess, till the whole was dissolved, and afterwards evaporated to dryness; by dissolving the muriates in water, the siliceous part was then completely separated, and the muriates afterwards examined. As the results nearly resembled each other; and the muriates of alumine,

magnesia, lime, and iron, were ascertained to be in solution; it appeared probable, that the green colour is to be attributed to the oxyd of iron, in that state of combination with the earth as to constitute a species of chlorite.

From these examinations, I am induced to believe these marls to resemble our chloritic sands, such as the green sand observed under the chalk strata of Pewsey, Warminster, &c. In order to ascertain how far this supposition might be correct, I procured from these places some green sand, and observed very little difference, except in the proportion of silex being less. It is well known, that all the lands where the green sand exists is very fertile; and the green sand mixed with manure forms a very rich compost.

From the analyses of these marls undertaken in America by Mr. Cooper, it would appear that they contained some sulphat of iron, and some vegetable extractive matter. In those subjected to my examination I could not trace the smallest portion of either. In the analysis made by Mr. Cloud, it is observed that after the lixiviation of the mineral with river water, a deep black colour was produced by the tincture of galls. In my lixiviations I employed distilled water; and nothing was indicated by the gallic acid, as to shew the existence of the

smallest portion of iron. When the nitro-muriatic acid was poured upon the marls, upon the application of heat, a gentle effervescence took place; as no lime was present, and iron being found in the acid solutions, it is evident that the iron thus taken up must have been in the state of a carbonate.

It has been remarked, by the American agriculturists, that the marls are more beneficial, after atmospheric exposure: it would be adviseable to recommend to agriculturists in Wiltshire, Dorsetshire, and various other places, where green sand exists, to ascertain, by a series of experiments, what changes are effected by atmospheric influence. With Mr. Cooper, I think, it is most probable, that the good qualities are principally to be attributed to the iron.

C. WILKINSON.

Bath, 1*st Dec.* 1816.

Article XI.

On the Commutation of Tithes.

["What is the best mode to be adopted, either gradual or immediate, for producing the Extinction of Tithes; whereby the present Proprietors, whether Clergy or Laity, may receive a fair compensation; and Agriculture be relieved from one of the greatest obstacles to an increased growth of corn, for the support of the people, whose numbers are hourly increasing."]

TO draw with a clear and stong hand the line of justice, is the utmost that the theorist can do. Every change, purchase, or bargain, is subject, not only to the will, but to the prejudice and passion of both parties; reason may influence the will; but the closet logician cannot mete, weigh, or judge, with the balances that prejudice and passion produce.

If the wisdom of the Legislature shall resolve to enforce *the benefit of the community*, without regard to *individual approval*, it will require

that the benefit be clearly ascertained, and that the refusal or approval be proved to be capricious or futile. The wisdom of the Legislature must stand upon the broad basis of equity.

Now, it has been often clearly ascertained, that tithes are one of the greatest obstacles to the improvement and increase of arable land; and it is self-evident, that the cultivation of arable land supplies the most urgent and general want of the community; the only thing, then, remaining to be shewn is, how the commutation of tithes may be acceded to, according to the principle of undeviating equity.

In a small scale, this common benefit, without regard to individual approval, has been often weighed, when canals and highways have imperiously demanded both the land and the tithe. To draw the line of justice, we must reflect what has been done in these cases; and here, and in all cases, *a full compensation for every demand is the object sought.*

It would branch away too far from the subject of discussion, to examine particular statements; the ramifications of great and of small tithes, in many cases mingled together, determined by the variety of custom, convenience, and agreement, cannot here be separately investigated; nor is it necessary, where *the best mode of a commutation is the thing required.*

This equitable line is all that the following Treatise can attempt to draw; from this there should be no deviation, its excess must be left to contingencies.

With these preliminary remarks, which the subject demands, a short quotation from an established source will be sufficient to illustrate titheable property, without involving the plain argument by endless theories and dogmas, beyond the point in view. "Tithe is the *tenth* "part of the *increase yearly arising and renew-* "*ing from the profits of the land,* the *stock* upon "land, and the *personal* industry of the inhabi- "tants:—the first species being usually called "PREDIAL, as of corn, hops, and woods:—the "second MIXED, as of wool, milk, pigs, &c. "consisting of natural products, but nurtured "and preserved, in part, by the care of man; "and of these the tenth must be paid in gross:— "the third PERSONAL, as of manual occupations, "trades, fisheries, and the like; and of these "only the tenth part of *the clear gain* and *pro-* "*fit,* is due. In general, tithes are to be paid "for every thing that yields an annual increase, "as corn, hay, fruit, cattle, poultry, and the "like; but not for any thing that is of the "substance of the earth, or is not of annual in- "crease, as stone, lime, chalk, and the like; "nor for creatures that are of a wild nature, as

"deer, hawks, &c.; whose increase, so as to "profit the owner, is not annual, but casual." —*Blackstone's Commentaries*, vol. ii. p. 24.

By investigating what data *cannot* be taken for a fair compensation; the *negative* argument will lead, more accurately, to an affirmative one.

1*st*. A Proportion according to the Rent.

The rent may be erroneous, too much or too little; the value of the tithes, then, cannot be correctly ascertained by this rule. But suppose it be a fair rent, will one-third, one-fourth, one-fifth, or any other proportion, (be it remembered, that the figures taken in this, and in every case, do not presume to fix a criterion, but are only used to exemplify the argument,) be ever the right? Certainly not: for the mere produce of the land may not be the only, may not be the chief, object of the tenant.

The rent may be determined from locality and convenience, which locality and convenience may yield no beneficial produce to the tithe-man. According to the rental for land, in the vicinity of towns, and in the retirement of the country, the tithe of corn, hay, &c. can bear no proportion with the increase of rent. Meadows near a populous town bear a high rent, for the advantage of turning out cattle, for

the sake of air and exercise, and to save the expense of stabling, while the value of the crop may be very trifling; and tithes from a small quantity of land may be scarcely worth collecting, at the very time that the occupation may be most desirable. The argument needs no support from an extreme case; yet the extreme point leads to the gradations. A Sydney-Gardens pleasure-grounds, and all that fashion, folly, and speculation, produce titheable, may be omitted; the reasoning must abide by general principles. Luxury, indeed, has little to do with these dues; it is industry that pays tithes; it is industry that claims relief.

2dly. A Proportion according to the Value of the Land.

The fluctuation of value in land may not affect the tithe. Not only locality and convenience, but the appropriation, of the property itself may increase the land value, and not the tithe. And, otherwise, the tenure, the title, and contingencies, may decrease the land value, and not the tithe. Adjoining lands too of like value produce very different tithes; twenty acres may may pay a tithe in proportion to its saleable price; the next twenty, at like price, may be purchased for roads, buildings, canals, and other purposes, and yield no tithe.

Lord Ducie is reported to have sold some land at Manchester at the rate of £30,000 an acre; it was bought for the Bason of the Liverpool Canal; and, of course, the tithe value would have been strangely estimated by any land proportion.

3dly. A MIXT VALUATION BETWEEN THE VALUE OF THE RENT AND THE LAND.

A negation of a negative may be an affirmative; but two erroneous conclusions united can only produce the division of an error; or, as the two foregoing modes of valuing the tithes err upon general principles, and as the errors do not take different extremes, the result must be wrong, according to the portions taken. Assuredly, it needs not further argument to shew, that land *purchased* for building, or *let* on a lease for that purpose, or cut to pieces for any other useful and valuable scheme, or for mere speculation, may wholly, or partly, lose its tithes; or at least, that the tithes bear no proportion to rent or purchase.

4thly. THE CROP ITSELF.

Neither can the crop itself (though a fair average leads to the thing required) be a criterion for the commutation of tithes.

The occupier may be a bad farmer, or he may eventually impoverish the land by forcing large crops: in the former case, an inferiority, in the latter, a superiority, of value will be affixed. Let it be remembered, that there is but *one* tie, though the strongest of all ties, that binds the tithe and the land owner together—INTEREST. And, all powerful as this bond is, we see it, in a variety of cases, wholly and partly destroyed. Farms have been permitted to run to waste, rather than raise a crop to the advantage of the tithe-gatherer; indifferent management continually takes place; and *untitheable* speculations are common: so that sheep-farms, and corn-farms, are forced from their nature, according as the occupier feels the pressure of tithe; not to mention the unfair advantages, the vexatious proceedings, and injurious envies, to which the titheholder is liable. How many obstacles arise, then, to prevent *the mere crop* from affixing the desired mode for a valuation of tithes!

It may now fairly be asked, since tithes are ungracious in tenure, and precarious in possession, why are not the holders of them more disposed to accept a commutation?

The answer, it is presumed, must be, that the tenacity of tithe property arises from a too fa-

vourable valuation of tithes, and from the peculiar nature of their value. When tithes are grossly reckoned at one-third, or other proportion, of the rack rent; or thirty or more years purchase; or one-third, one-fourth, or one-fifth, of the property itself, is required in lieu; the owners of land of high purchase are unwilling to accede to it; though, where land is not yet brought into cultivation, the proprietors have no objection to surrender the larger portion, that, without obstacle, they may improve the remainder. The tithe of morassy, steril land might be cheaply purchased at a very high rate, even to a moiety; while it would be the proportion of Procrustes, to stretch well-cultivated land, enriched at a great expense, on the same iron scale.

Again, the man, who has for years felt the increasing value of his property in tithes and objects to personal care and business, says, "I "can see nothing that can be a recompense for "my tithes. My property improves, without "any effort or expense on my part; and if "I have land in lieu, I only exchange for trouble "and uncertainty." Upon this view of the subject, a witty pamphlet was produced, a few years ago, by some clerical tithe-owner, with a title from the Arabian tales: "Who will ex-"change old lamps for new?" alluding to the

Princess Badroulboudour's fatal simplicity, in being, by the offer of a *new* lamp, decoyed by the magician out of the *wonderful* lamp of Aladdin. While the College-Fellow, buoyed by his ephemeral rights, thus indulges his leisure in the magic influence of tithe-wealth; the man of business says, "By my tithes, I have in-"creased the means of improving mine own "land. I not only get a desirable considera-"tion, but I am recompensed for my trouble "in collecting it, by the commodity that I "chiefly need." And thus, on account of the *manure*, another instance appears of the greater proportional value of tithes in the country, than in the neighbourhood of towns. Many interested pleas, and insidious arguments, arise from the advantage of taking the tithe in kind, which can only be met, and answered, *by proposing a fair compensation*, to which the subject directly, and affirmatively, proceeds.

It seems to the present writer, therefore, that *the best mode to produce the extinction of tithes, and to afford a fair compensation to the owners of them, whether clergy or laity, without any gross detriment to the landholders, is to revert to the first principles of barter.* What is the real value of any commodity? That, which, at a fair auction, it will produce of the circulating medium of the country. Surely it is childish to

hear any one assert, that his saleable article will not produce its value. What affixes that value? The wants of the community. The demand for a commodity, or the inability to make the purchase, may change at once the value. Tithes may be more, in proportion, worth the collecting from a large than a small estate; yet large estates, like large diamonds of the brightest lustre, will rarely sell in proportion of price to smaller ones. It is curious to read,—"The famous diamond in the sceptre of "the Emperor of Russia weighs 779 carats, and "is worth at least £4,854,728." So far its estimated price. "It hardly cost 135,417 guineas." This, after passing through several hands, was the utmost the merchants could get for it: this, then, though only one thirty-fifth of its *alleged*, was evidently its *real*, value. What is its *saleable* worth, is alike the rule for wool and corn; and so must the TITHE be adjudged.

If I take my next neighbour's tithes, and our lands intermingle; or, if I am obliged to fetch my tithes at the distance of ten miles; is there not a great difference to me, though there be none to him? But if I have let him a lease of my tithes, neighbourhood or distance, a large or small crop, increase or decrease of price, affect me not; while there may be great variations in the value of the bargain to him. In every ex-

change, in every purchase, BOTH PARTIES, the buyer and the seller, *ought to be satisfied.* Shall the seller say to the buyer,—These tithes are worth £200 a year to you; they have been reckoned at 32 years purchase: that is my demand? Shall the buyer answer him,—They are are worth but £50 a year to you, they have been valued at 25 years purchase: that is my offer for them? If the seller ask according to their value to the buyer, he asks unfairly; if the buyer require according to their value to the seller, he requires an unfair, because in both cases it is a partial, price. Why does any one sell, but because he had rather have the money. Why does any one purchase, but that the goods are more desirable to him than that which he gives for them. SO IT MUST BE IN THE COMMUTATION OF TITHES.

Adjudge them by these rules.

Let each party choose a valuer, and let the two agree together for a third. Then let the three correctly ascertain the tithe-right. This being clearly defined, let them proceed to make three valuations, in the following manner.

1st. What has been the value of the tithes for a certain number of foregoing years, and what will probably be their value for the like number of following ones; the cultivation of the land

being brought to a fair consideration, and deducting the expenses of collecting, &c.

2dly. What is the value of the tithes to the tithe-owner?

3dly. What is the value of the tithes to the land owner?

From these *three* valuations let there be ONE drawn; and the result in every case must be, that both parties will find themselves benefited. The tithe-owner will get more for his tithes than any worth they can be to himself; and the owner of the land will purchase, though at more than any other can afford to give, at a price inferior to the advantage which will accrue to him from the purchase.

As in many cases the difference of value will be very great between the *land* and *tithe* owner, and the SECOND valuation being in favour of the *former*, and the THIRD of the *latter;* the FIRST is given for the balance, that shall prevent an undue preponderance of *either* of the opposite scales.

Upon a *general* case, it would be trifling to argue, *what property* the tithe-owner is to receive in lieu of his tithes. THE BEST MODE is the only object of the present reasoning; and whether money, or money's worth, must be left to the peculiarities of the case, and to the situation of the parties. Having once ascertained the

BEST MODE, *i. e.* the fair purchase-worth being known, the means of payment is a secondary consideration. Yet let it be remarked, that when a commutation for tithes is to take place, by giving up a portion of the land, the value of the land must make a part of the valuation of the tithes; for this reason, that the same valuation which has influenced the worth of the property may be taken in the payment.

Let a supposed case be stated.

A person has the right to the whole of the tithes. The cultivation at present is on a fair management. The value of the tithe on an average is £110. Its value to the tithe-owner, not having any land in the parish, is £95; that is, he cannot make £110, without expense and trouble on his part, either to let or take it himself, equal to the difference of £15. Its value to the landowner (who, if he could purchase, would improve at great expense the cultivation) is £140.

Thus £110+95+140=£345; divided by 3 is £115. £115, at 30 years purchase, £3450. But land is to be given in lieu of tithes. The whole estate is 250 acres, worth at an average £60 per acre, *i. e.* £15,000. To the foregoing £3450, add $\frac{1}{4}$ of £15,000, which is £3750; and divide £7200 by 2 = £3600. Which sum of £3600, at £60 per acre, will purchase 60 acres. In this case 60 acres, or $\frac{6}{25}$, is the compensation

for the tithe of 250 acres; each acre of course is taken at the same worth, for variations of this kind need not enter into a more exemplifying statement.

Let it again be remarked, that neither the proportion of land, nor the number of years for an average of the crop, nor the number of years purchase, nor any figures are given otherwise than as a specimen to exhibit THE MODE of adjudging the value.

Let two extreme cases be stated.

A person has a right to the whole tithes; the cultivation very imperfect, on account of the situation, the poverty of the land, and the expense requisite.

The value of the tithe £60. Its value to the tithe-owner £55. Its value (to purchase) to the landowner £200. Thus £60+55+200=£315; divided by 3 is £105; at 30 years purchase, £3150. Land is to be given in lieu. The whole estate is 2000 acres, worth at an average £4 per acre, *i. e.* £8000. To the foregoing £3150 add $\frac{1}{4}$ of £8000, which is £2000; and divide £5150 by 2 = £2575. £2575 at £4 per acre, will purchase 644 acres. In this case the compensation for the tithe approaches $\frac{1}{3}$ of the land; it being worth the landholder's while to give up so large a portion, that he may improve

the remainder, unincumbered by the increasing burden of tithes.

The third case takes the other extreme.

A person has the whole tithe. The cultivation is the highest. The value of the tithe is £100; to the tithe-owner £95; to the landowner, £120. The estate is 200 acres; but being in the neighbourhood of a large town is let, for many different purposes, at a high rent; and is worth, to purchase, £130 per acre. Thus, £100+95+120 = £315; divided by 3 is £105; at 30 years purchase is £3150. Here £3150 is the full compensation for the tithe of land worth £26,000. Land is not supposed to be given in lieu; but if it were, nearly $\frac{1}{9}$ would be the portion required.

Though 30 years purchase is taken in every case, it might further be argued, that different tithes may have a different temporary worth; *but this and other points must ever be left to the valuers appointed by both parties.* A REGULAR AND FAIR MODE OF AFFIXING THE COMPENSATION FOR TITHES, SO THAT IN EVERY CASE THE LINE OF EQUITABLE JUSTICE MAY BE DRAWN BETWEEN, AND TO THE MUTUAL ADVANTAGE OF, BOTH TITHE AND LAND OWNER, HAS BEEN THE AIM OF THE WRITER.

N. B. As different views of the same subject more correctly investigate it, the three valuations

may be taken by three different sets of valuers, uninfluenced and unconnected by each other.

Upon a gradual or immediate abolition of tithes it is only to be remarked, that a principal paid in small portions, though convenient to the *buyer*, will probably be the contrary to the *receiver*, who, by having it in one sum, can more advantageously dispose of the same. A *gradual* abolition of tithe (if by the expression *gradual* is meant, that each tithe right is to be *gradually* compensated) appears then not so desirable as an *immediate* one; but if *gradual* refers to *seasonable*, in contradiction to *summary*, abolition, it is presumed that every means of conciliation to both parties, by arrangements, &c. &c. should be adopted.

There may be persons inclined to accept a fixed perpetual annuity on the land, or a variable corn rent, or even a scheme of government security; these, indeed, can never be a GENERAL compensation for tithe: yet these and all other may be alike properly estimated *by the mode here given.*

If it would not branch from the immediate subject, among others, the varying influence of poor-rates, of price of labour, and of vicinity and conveniency of markets, might be considered; but let it not be omitted, that in case

of a tithe compensation bill being sanctioned by the wisdom of the Legislature, ANY NEW SUBJECT OR OCCASION FOR TITHE MIGHT, VERY FAIRLY TO BOTH PARTIES, BE PROVIDED AGAINST. It needs no argument that this alone would be a most desirable release from one of the greatest obstacles to an increased growth of corn, and may be, with submission, recommended as a preliminary arrangement to a *general abolition.*

If the foregoing reasoning be correct, three corollaries may be drawn as a conclusion.

First. The poorer the land, the greater is the proportion required in exchange for tithes.

Secondly. The advantage which accrues to land from the vicinity of great towns, by the easy application to different purposes, does *not* increase the tithe-owner's property in proportion to the landowner's.

Thirdly. In all cases where an exchange or purchase is desirable, the tithes are worth more to the owner of the land than to any other person.

CHRISTIAN LIBERTY.

ARTICLE XII.

On the Commutation of Tithes.

[Being the copy of a Letter addressed to the Committee of the Bath and West of England Agricultural Society, for promoting the Commutation of Tithes.]

Southampton, Feb. 8, 1816.

GENTLEMEN,

I Must leave it to others to enlarge upon the necessity of a Commutation of Tithes, for the protection of the agricultural interests of the country; my attention, as a churchman, and a well-wisher to the government, having been principally directed to the religious and political evils arising from the present mode of providing a maintenance for the Ministers of the Church of England. If I venture to offer to the Committee a few thoughts upon this important subject, it is, because I have long witnessed, with concern, the injurious tendency of

a system, which constitutes a perpetual source of conflict between the clergy and their parishioners; presenting, in many instances, an insurmountable obstacle to their acquitting themselves usefully of those duties, which alone the Legislature had in view, when it assigned a maintenance; and, in all cases, laying a foundation for those charges of lukewarmness towards the Government, and hostility towards the Established Church, with which the warm advocates of tithe generally overwhelm the Dissenters. These charges have been, of late, repeated with great vehemence; but I am well persuaded, that, if in any case they can be at all justified, the cause of such lukewarmness and hostility may be directly traced to that feeling of dissatisfaction, which must arise in the mind of every man who finds himself perpetually called upon to contribute to support the ministers of a church which he disowns; and, still more, of every man who finds himself depressed, and denied important political privileges, lest he should acquire the power to withhold that contribution. It is certain, that, while the present tithe system maintains its ground, we can never become an united people; for if Dissenters and Roman Catholics are ever to be placed on the same footing with their fellow-subjects; if it is wished to secure, and to augment their attach-

ment to the government, by admitting them to all those privileges, to which, as British subjects, they think themselves entitled; it is obvious, that an equal taxation must form the basis of such an arragement. But it is vain to talk of an equal or reciprocal taxation, while all these descriptions of persons are taxed, and very highly taxed, in the form of tithes, for the support of our Church, of which they are not members; although churchmen are subject to no impost whatever for the maintenance of the religious establishments of the Dissenters and Roman Catholics. This is not equitable; and it is clear, therefore, that, as long as this unequal taxation continues, the political disabilities of the Dissenters and Roman-Catholics must be perpetuated; because, to strengthen the hands of those from whom justice is withheld, is to challenge an hazardous conflict. On the other hand, let a commutation of tithes take place, and it will be difficult to suggest any reason, why less loyalty should be found among Dissenters and Roman Catholics, than among Churchmen. Sectaries will then be without a motive for wishing the downfal of a church, which no longer is the cause of hardship to them; which is not maintained at their expence, and presents no obstacle to their worldly prosperity. They undoubtedly would, as they

do now, endeavour to place their own peculiar opinions in an advantageous light; but there would remain to them no ground for political hostility. They would regard the Church of England, and its lands, as they now regard the religious institutions of each other; for they also, have their church property, their donations, and contributions. They would perceive in the Church of England some things, of which they do not happen to approve; but they would see nothing to *hate;* nothing oppressive upon themselves; nothing that would make it dangerous to concede to them all the privileges of good subjects. To the present tithe system, undoubtedly, may be referred whatever of lukewarmness and hostility some persons have supposed to exist among the Dissenters; but it presents itself as a cause of irritation in a still more aggravated form, as it affects the Roman Catholics, who are compelled to pay to our clergy the very tithes which were, by the intervention of Acts of Parliament, taken from their own, and which (as they consider them to have been held *jure divino*) they cannot regar, as subject to any legislative interference, nor as capable of being diverted from their original appropriation by any *human* laws whatever. There is, indeed, something preeminently oppressive in compelling this class of his Ma-

jesty's subjects to contribute to the support of a church which they deem heretical, and to which, therefore, they cannot pay tithes, without committing, in their view of the subject, a grievous sin. It is hardly possible to conceive a more cruel dilemma, than that in which our tithe system places the Roman Catholics. The best interests of the state, the happiness and prosperity of the country, and that good understanding which ought always to subsist between a clergyman and his parishioners, and without which he is worse than useless;—all require, that a system pregnant with so many evils should terminate.

For this purpose, I would propose a general redemption of tithes, of which the proceeds should be applied to the purchase of lands, to be annexed to the different parish churches, for the maintenance of their respective ministers. These lands to be let for a term of years, by the minister and churchwardens for the time being, conjointly, assisted by a surveyor, (appointed by the Bishop for the whole diocese,) who should be, of course, a man of great respectability, subject to dismissal for negligence, and to a severe responsibility, if he should be found at any time acting in collusion with the lessee or the incumbent. This officer should be a kind of steward for the whole of the church

lands in the diocese; and in that case, it could hardly be requisite to hold the representatives of the incumbent answerable for dilapidations, because a lease with proper clauses, and the general superintendance of the surveyor, would be a sufficient security against any very important deterioration. This mode of supporting the Minister of the Church would, I apprehend, be found more eligible than that of a corn rent; because the latter, like the tithe, must, in many instances, be levied upon persons who are not members of the Established Church of England, and, consequently, the great cause of political jealousy and irritation, though modified, would not be removed. Even the redemption of tithe might, it is true, be felt as an hardship, by the Dissenters and Roman Catholics, but it would be felt *once for all.* I am persuaded, that they would accept such an alternative, as the less of two evils, and even with joy and gratitude, as removing the political cause of their present civil disabilities. This would be *their* indemnity.

If, then, this salutary measure would tend to conciliate some millions of the people of these kingdoms; from what quarter is any opposition to be expected? Would it compromise the interests of the Clergy, whose usefulness it would promote? I apprehend, that it would

not. I would on no account propose to interfere with the tithe system, without specially protecting those vested life-interests, which the Beneficed Clergy possess in their respective livings. Whatever changes are made, they cannot take effect (except by consent) during the life-time of the existing incumbent, whose vested interests must not be violated. But the arrangement might be made, and the law enacted, prospectively, to be acted upon as the vacancies occur.

I am not ignorant that the Bath and West of England Society have been charged with a systematic plan for encroaching upon the rights and property of the *Church;* and that this charge has been coupled with an appeal to the Clergy, as though the *Clergy* were the *Church;* and as though the hereditary property of that particular class of individuals were attacked. With as much and more propriety might naval and military officers raise an outcry about their hereditary property, when, at the conclusion of a war, ships are laid up in ordinary, and regiments reduced. With as much reason, if it were proposed, to modify the salaries of the medical attendants of a county hospital, after the death or resignation of the gentlemen actually holding those appointments, might that proposal be represented as an attempt to encroach upon the *rights* and *property* of the faculty. It must be

kept in mind, that the *people* of England are both scripturally and *legally* the *Church* of England; and to that Church the Legislature has appropriated a certain revenue, levied upon each parish, for the support of the Minister for the time being. The Church our nineteenth Article declares to be "a congregation of faith-"ful men;" and it is for this church, and by this church, that the minister is to be remunerated; not that the church is his hereditary property, but because the church has occasion for his services; and looking to those services, the Legislature has judged it more conducive to the spiritual welfare of the church, that he should hold the appointment for life; except in cases of peculiar misconduct, when the good of the church requires that he should be deprived. Before the charge of invading the property of the clergy was attempted, it should have been proved, that the minister is the congregation, and that our nineteenth article gives an erroneous definition of the visible church. It is, indeed, altogether useless to dwell upon this absurd pretension, which might, with more consistency, be urged by the Roman Catholic clergy in this country, upon the principle of "divine "right," and with whom this pretension to an hereditary, inalienable estate, in the tithe tax, originated. The tithe, like the poors'-rate, is

a parochial tax levied for a specific purpose, under the authority of the law of the land, and whenever that purpose can be more effectually promoted by a new arangement, without compromising any existing life interests, the Legislature has an undoubted right to make that alteration.

I have the honour to be, Gentlemen,

Your most obedient servant,

THOMAS EDWARDS, LL. D.

Article XIII.

Result of some Experiments in burning of Clay; in a Letter to the Society.

[By the Rev. W. Wilkieson.]

Gentlemen,

I Have been led to believe, that the result of some experiments, I have had it in my power to make, in the burning of clay, and in the use of clay ashes as manure, may be acceptable to the Society.

In making this communication, however, I take leave to premise, that I have no view to the premium you have offered on this subject, I am aware that the offer is confined to experiments made in the Western Counties.

At Lady-day, 1815, a tenant threw up a farm belonging to me at Woodbury, in Cambridgeshire; and I was induced, by many circumstances, to take it into my own occupation. The farm is of very considerable extent, and chiefly under the plough; the soil, a cold, stiff, tenacious clay; it had been overcropped for a long series of years, without a proportionate return of manure; and it is so situated, that no quantity of manure is to be purchased in the neighbourhood. It became my object, then, to raise as much manure as possible on the premises; and for this purpose I procured a north-country bailiff, who understands the management of turnips on a heavy soil; and having by accident seen Mr. Craig's letter on the burning of clay, I conceived mine to be a soil well suited to the practice. I accordingly, after some correspondence with that gentleman on the subject, made my first experiment in the end of September, 1815. I deviated a little from the plan laid down in Mr. Craig's printed letter. Having marked out a space of 15 feet by 12, I excavated it one foot deep, and with the soil thrown

out made a wall around the space. At each corner I made an air-pipe, each pipe (made of rods) extending only two feet into the enclosure, in a diagonal direction. In the centre of the enclosure I placed upright the but end of a large tree, around which other fuel was placed, covering the bottom of the whole space within the wall. The fuel consisted of straw, bushes, large billets of wood, aud dry roots of trees. I then put dry turf over the whole surface, which again was covered with a thin coat of clay, newly dug up, except a small hole by which the fire was introduced. The fuel being dry, the fire spread rapidly, and it required the active exertions of two men to smother the flames as they burst out; they used for this purpose dry turf, which they immediately covered with clay. During the first two or three days the surface of the heap occasionally sunk in places, and apparently grew cold; into these places fresh fuel was put, care being taken to make but small openings; and I may here remark, that this operation should be done as speedily as possible; for external air let into the heap, after it was once fairly on fire, seems to do mischief.

It now burned well, and evenly over the whole surface, for several days; each covering of clay crumbling to ashes in an hour or two after it was put on. It appeared to burn quicker or

slower, according to the state of the atmosphere. In about a week's time from the commencement of the experiment, the heap grew to such a height, that a difficulty arose in lodging the fresh clay on the top of it, although the walls had been heightened; and I attempted, as recommended by Mr. Craig, to pull down one of the side walls, and enlarge the base by spreading the hot ashes. In this attempt I did not succeed without much trouble; and I was obliged to add a great quantity of fresh fuel, before I could accomplish my object, and restore the heap to its former heat. It continued to burn well four or five days after this operation; but as the days were becoming short, I did not attempt to spread the base still further, but permitted it to burn out.

This heap was on fire twelve days, and was constantly attended in its progress by two men, from four o'clock in the morning till nine at night; when a thicker coat of clay than usual was put on: one of these men was chiefly employed in digging the clay, the other in wheeling it (only a few yards) to the heap, and throwing it on, sometimes by hand, and sometimes with a spade. This heap I afterwards found contained 37 cart-loads of ashes; and as my farm lies nearly level, and it was removed to no great

distance, the carts were well filled; each load, probably, consisted of a cubic yard of ashes.

In the spring of this year, 1816, I burned another heap, which was found to contain upwards of 40 loads of ashes; and during the summer I burned two more heaps, the one contained 72 loads of ashes, the other about 55 loads.

I will not take up your time in describing the progress of these heaps so accurately as I have done that of the first. In fact, the operation proceeded in all the cases precisely in the same manner. I remarked, however, latterly, that the labourer who conducted this business for me became more expert, especially in spreading the base of the heap; though, even at last, this was not done without a considerable expenditure of fuel. I never had more than two men and a boy employed at once; and my bailiff having kept an exact account of the expense attending these experiments, I am enabled to state, that, on the average, the cost was about 1s. 6d. the cart-load. In this calculation nothing is charged for the fuel, having plenty of bushes and offal wood on the premises; a value, however, was put upon it as it was used, and 3d. or 4d. per load may be added on this account; I may therefore say, that the whole cost was 1s. 9d. the cart-load.

I will now add a few general remarks, which may be useful to any one who may wish to burn subsoil. The fire appears to spread upwards most readily, and the heap grows first cold at the bottom, and towards the walls, for I seldom remarked that the fire penetrated through the walls. As my experiments were made in different parts of the farm, there was a slight variation in the soil; and I observed, that, where the clay had no mixture of gravel or stones in it, it burned the best; and I always thought it crumbled quicker, when it was put on newly dug up. Summer is certainly the best season for this operation, chiefly on account of the short nights, which permit the heaps to be watched with more ease. Moderate rain does but little harm to the fire; high winds are infinitely more destructive to it. I do not think the clay loses much in quantity by being exposed to the action of fire; but it certainly decreases in weight. Wood is supposed to be the best kind of fuel, coal requiring too much air to promote combustion.

It now remains for me to give what information I am able, in regard to the beneficial effects of clay ashes as a manure. The heap of ashes I burned in the autumn of 1815, was used early in this year to manure an acre and a half of land, part of a much larger field. A part of the same field had been folded late in last year with

sheep, and the remainder was manured with very good yard dung. The whole field was cropped with barley; and either from the seed being ploughed in too deep, or some other cause, the crop was not a very good one; but I may truly say, that the part manured with ashes was better than that dunged: the part folded was evidently the worst. The same gradation may now be observed in the clover plants, the seed of which was sown soon after the barley.

The greater part of the heap of ashes I burned this spring was used in the beginning of June to manure an acre and a quarter of land, in the middle of a field of five acres, the remainder of which was manured with the best yard dung. The whole was sown towards the middle of that month with red-rind turnip seed; a Northumberland drill was employed to deposit the seed; the distance between the ridges being two feet and a half, so as to admit the horse hoe. The crop is a very good one indeed, many of the turnips being 26 inches in circumference; and one, which I had taken up and weighed, was 29 inches in circumference, and weighed 11½lbs. I do not perceive that the part manured with clay ashes has at all an inferior crop on it to the rest of the field; my bailiff, indeed, remarked, that on the plants first coming up, he thought them there the best.

From this heap of ashes six loads had been reserved, which were thrown, the end of June, over somewhat less than a quarter of acre of rough grass land; and it is perceptible, that the sheep, during the summer, have eaten that part of the field more closely than the rest of it.

The two heaps of ashes I burned during the summer, containing together, near 130 loads, have been used, this last October, to dress six acres of land, which had been got into a good tilth by a naked fallow; the ashes were first spread, the wheat seed was then sown, and they were lightly ploughed in together. The rest of the field, in which these six acres lie, had been folded with sheep on a naked fallow, and was sown with wheat about the same time. I left my farm about ten days ago, when the young wheat was just come up; and it appeared full as thick on that part of the field manured with the ashes, as on the remainder of it.

I have thus, in the course of a year, burned upwards of 200 loads of ashes, and manured nine acres of land, at an expense, fuel included, of about £18; and I am so well pleased with the result of these experiments, that it is my fixed intention to burn ashes, to a much greater extent, during the next year.

Having brought my communication to a close, I may be permitted to say, that the

practice of burning subsoil is not altogether novel; Lord Halifax, and others, pursued it in the beginning of the last century; and successful experiments of the same nature have been made from time to time, until Mr. Craig, of late years, has introduced the practice into the south-western parts of Scotland. It is now to be hoped, that, being better understood, it will become more general. I take the liberty, however, of recommending to those gentlemen, who feel inclined to burn subsoil, to consider, first, the fitness of their soil for the purpose; and whether or not their situation affords a facility of procuring other well-known manures; for, as this practice is not unattended with expense, it must always be a matter of calculation, whether other manures cannot be procured cheaper.

I would, lastly, recommend to them, if they do make the trial, not to be content with a single, desultory experiment, which, from many causes, may possibly fail. My own success, in the first instance, I attribute, in some measure, to having a plentiful supply of dry fuel on the spot; but chiefly to the repeated instructions of Mr. Craig, to whom, I thus publicly make my grateful acknowledgments.

I do not think the practice likely to spread among *tenants* of farms; few tenants will go to the expense of purchasing fuel; and few land-

lords will allow them to cut it for this purpose on their farms; besides, the digging the soil disfigures the spot where it takes place, and few tenants will take the trouble to make it neat again.

I have the honour to remain, Gentlemen,

Your obedient humble servant,

WM. WILKIESON.

Bath, Nov. 22, 1816.

To the President, &c.

ARTICLE XIV.

Report of the Committee for managing the Ploughing Match, 1816.

AT a Meeting of the Bath Society, we were appointed a Committee to conduct the experiment of the Ploughing Match, for the premiums of the same. We had the good fortune to obtain permission of Mr. Enoch Williams to use a field in his occupation, in the

parish of Henbury, delightfully situated under the Western side of King's-Weston Hill; of which we gave very public notice, and of the time when the said premiums would be contended for.

The Committee having measured out twelve lots of land in the aforesaid field, of half an acre each, they marked them respectively from A. to M. inclusive. There appearing to be *nine* competitors, the three first letters were withdrawn, and the others put into a hat. The ploughmen drew as follows, and repaired to their posts, answering to the letters they had respectively drawn; the Committee having previously chosen Mr. Thomas Sarjeant, Mr. John Stych, and Mr. Enoch Williams, (farmers of repute in the district,) to be adjudicators in the competition. It was determined, that the furrows should be four and a half inches deep, and nine wide.

Ground marked.	Was occupied by	Owners.	Drawn by	Ploughmen.	Time.	Furrows.
					h. *m.*	
D.	Swing Plough,	F. Kingston, esq;	2 Oxen,		2 51	26
E.	Scotch ditto,	R. H. Davis, esq;	2 Horses,	Jas. Beasant,	1 56	24
F.	Northumberland ditto,	G. W. Hall, esq;	1 Horse,	Jas. Williams,	Withdrawn.	
G.	Ditto,	Mr. Buckland,	2 Horses,	John Fleming,	2 5	27
H.	Beverstone ditto,	Mr. Luton,	2 Horses,	G. Hawkes,	2 0	25
I.	Scotch ditto,	Mr. Tyler,	2 Horses,	Himself & driver,	1 46	24
K.	Suffolk ditto,	Mr. Harris,	2 Horses,	Himself,	2 31	26
L.	Scotch ditto,	Mr. Fyson,	2 Horses,	Jas. Tanner,	2 8	26
M.	Ditto,	P. J. Miles, esq;	2 Horses,	Jas. Scutt,	2 2	26

The day threatening to be wet prevented a larger concourse of spectators from the neighbourhood from attending. As it was, a considerable number *did* assemble; and after the competition was ended, many gentlemen and respectable farmers adjourned to King's-Weston Inn, where they were regaled with a frugal repast; discussing the subject to which the day had been appropriated, and commending the spirit and liberality of the Society. After dinner, the umpires withdrew to consult with each other on the merit of the ploughs and ploughmen, and the work done. In a short time, the following Report was brought up, and read, in the presence of the company.

"*King's-Weston Inn, Oct.* 4, 1816.

"At the request of a Committee of the Bath "and West of England Agricultural Society, "we have undertaken to become umpires on "the merits of sundry ploughs contending for "the premiums proposed by the said Society; "and are unanimously of opinion, that Mr. "Joseph Fyson, jun. is entitled to the first pre- "mium, namely, *Five Pounds*; and James "Tanner, his ploughman, to a stout Coat and "Buttons, and One Guinea. And that Mr. "Harris, of Brislington, is entitled to the se-

"cond premium, namely, *Three Pounds*; and "the same, being his own ploughman, to a "stout Coat and Buttons. And we hope, this "adjudication will be approved by the Society; "being, in our best judgment, agreeable to the "meaning of the premiums proposed. We are "sorry, on regard of time, that we cannot re- "commend Mr. Buckland's plough to a pre- "mium; but we venture to recommend to the "Society to grant a special bounty to his "*ploughman*, and some consideration to all the "other ploughmen, for meritorious exertion, "and nearly uniform good workmanship.

"THOS. SARJEANT,
"JOHN STYCH,
"ENOCH WILLIAMS."

It is without hesitation, that the Committee assent to the adjudication of the first premium; since this, and the succeeding ploughman, even exceeded the depth appointed by the Committee, and allowed by them, as being the customary mode of the neighbourhood; and thereby rendered their work exceedingly complete, more beneficial to the farmer, for the purpose of covering his seed, and pleasing to the mechanical observer, on account of the regular angle of the furrow; as, whether the merit be attributed

to the construction of the implement, the strength of the horses, the skill of the ploughman or to the whole united, it must be allowed, that a specimen was exhibited of every quality that constitutes good ploughing, super-excellent in its appearance, and in its effects.

We also cordially agree with the umpires in their second adjudication. The implement was a one-handled Suffolk plough. By no means such a plough as but few of the spectators imagined likely to succeed in obtaining a premium. Nevertheless, owing to the owner, who was himself the ploughman, being much habituated to the implement, (which he brought from Essex,) being used to the horses, being an expert ploughman, and a zealous competitor, we think he was fairly entitled to the second premium. And we regret, with the umpires, that the premiums were limited to *two*, as Mr. Buckland's plough was highly deserving of praise; the workmanship not being inferior to the last mentioned, but not performed in so short a time. It was remarked, that his horses were very cool when the work was completed. To remedy this want of provision in the premium, without deviating from the rules of the Society, the umpires recommended to the Society to award a special bounty to Mr. Buckland's *ploughman*, *James Fleming*.

Of the plough drawn by *two oxen*, it may be remarked, that *that* sort of cattle, even allowing time, seldom contend successfully with horses. The ploughing was neat, but the furrows not uniformly of sufficient depth.

With respect to the plough drawn by *one* horse, it was urging an animal to an unequal contest, even allowing a sufficient proportion of time for the want of force. This the spirited competitor felt to be too great a sacrifice of his feelings, and he humanely discontinued the contest at an early period.

Another remark we deem worthy of making. One plough was drawn by two horses *tandem*. The ploughman observed, that they had been used to work in that manner, and could not be easily trained to work otherwise. The advantage of the horses drawing *abreast* was too apparent not to be noticed.

There was one deviation from the terms of the Society, namely, that *stiff clay* should be ploughed. After several disappointments in obtaining land, we were obliged to wave the condition. The land was a good loam, covered with an old grass ley, which, having lately been much saturated by rain, was rendered of considerable resistance.

Your Committee have already got the promise of some stiff clay soil for next year's experiment. It is situated in Somersetshire, to

which county, and Glocestershire, we recommended (as was suggested by the Vice-President, Thomas Græme, esq;) that it might be proposed to the Annual Meeting to confine their ploughing premiums to those counties; Wiltshire having established a system particularly for ploughing premiums, and the other counties being too remote. The competitors of this day are panting for a fresh opportunity of displaying their skill, and proving themselves worthy of the Society's premiums.

For the sake of giving encouragement to the labouring class of agriculturists, as well as to set an example of cheap and good ploughing, we would recommend that the Society's premiums for ploughing may be extended in number; and, if consistent with its funds, that these experiments may be more frequent.

There is one observation worthy of notice, and we feel great pleasure in making it, which is, that although the Society in its premium does not restrict competitors, in respect to the number of horses or oxen to be used in the experiment; yet it appears almost totally an obsolete practice to introduce a plough to contend for these premiums, to which more than two horses or oxen are attached. We hope this improvement prevails in *private* practice, it having been a chief aim of the Society to establish

this principle of employing less expense than has been too much the custom, except in particular and urgent cases.

Being intent on furthering every improvement, we thought we had reason to hope that a trial would have been made of the *dynanometer*, recommended to the Society's attention, at the last Annual Meeting, by John Benett, esq; but it was not produced. Although considerable advantages are derived from spirited competition, which contributes so manifestly to the formation of excellent ploughmen, it is admirable to ascertain the construction of such ploughs, as with equal power and equal skill will overcome the greatest resistance. This subject has engaged much of the attention of Dr. Wilkinson, who hopes, by the next ploughing match, to present one to the Society as a model, which will admit, upon a small scale, a practical application. And we further report, that it appears to us, nothing will so much contribute to the success and utility of those competitors, as appointing the time and place for every succeeding trial, before the Committee break up at the last meeting, instead of advertising the same, at an useless expense to the Society; because during such interval the competitors will be constantly practising and preparing for the day of trial, which will produce very superior exertions

at the appointed time; and that the expense of advertising may be most beneficially employed in rewarding any unsuccesful ploughmen, who may appear to the Committee to possess merit, by giving them a bounty or donation, not exceeding 20s. each: to which end your Committee have already procured a piece of strong clay, of old pasture, for a future trial.

We beg to conclude, by hoping that this report of the Ploughing Experiment will be satisfactory; and that the November Meeting will recommend the claimants at the Annual Meeting for confirmation of their respective premiums.

GEO. WEBB HALL,
CHAS. WILKINSON,
WILLIAM FALKNER.

ARTICLE XV.

[The following Paper was not originally intended for publication among the Transactions of the Society, having been addressed, as a private communication, by a Barrister of eminence in the city of Bristol, to a Magistrate of the county of Glocester. As the subject, however, is at all times, and more particularly at the present moment, intimately connected with the best interests of agriculture; and as the paper is written with considerable ability, and seems to throw new light on very important points connected with the history and administration of the Poor Laws; the Superintending Committee, having, with the writer's consent, been favoured with the communication thereof by the gentleman to whom it is addressed, can have no doubt that it will be considered by the Society as a valuable addition to their volume.]

DEAR SIR,

AS I heartily concurred in the suggestion which was lately offered by you, for providing *employment for the poor;* and seeing with much satisfaction, by a minute of the Glocester Quarter Sessions, published in one of our Bristol Papers, that it has been partly adopted; I beg leave to submit to you some observations which have occurred to me, upon a very cursory view of the subject; in the hope of confirming and

extending the timely and exemplary course which has been taken for that purpose. I am convinced, that it is the most immediate and effectual method which can be pursued for lessening the increased and still increasing burden, occasioned principally by the absurd and ruinous practice, so often permitted, of maintaining the parochial poor in *idleness;* a practice contrary to the clear intention and authority of the law, and inconsistent with the principles of justice and morality.

The intention of the Legislature was to alleviate the distress to which the poor had been reduced, through the want of employment (as I shall shew) by the (then) misconduct of the rich: this was no more than natural and political justice.

The occasion of the law will best explain the intention of it. It appears, in the reign of Henry VIII. that the agricultural population, in many parts of the kingdom, had been deprived of its accustomed employment, and consequently the means of support, by the selfish and improvident conduct of the great landowners.

The best contemporary writers, and the legislature itself, clearly exhibit the causes and consequences of the then destitute state of the poor. Sir Thomas More, one of the greatest men, both

in rank and ability, of that age, writes as follows: (see Utopia, lib. i. from the passage beginning "*oves vestræ.*" I give it in Bishop Burnett's Translation:) "Your sheep, which "are naturally mild, and easily kept in order, "may be said now to devour men, and un- "people, not only villages, but towns: for, "wherever it is found that the sheep of any soil "yield a softer and richer wool than ordinary, "there the nobility and gentry, and even those "holy men the Abbots, not contented with the "old rents which their farms yielded, nor think- "ing it enough that they, living at their ease, do "no good to the public, resolve to do it hurt "instead of good. They stop the course of "agriculture, destroying houses and towns, "reserving only the churches; and inclose "grounds, that they may lodge their sheep in "them: as if forests and parks had swallowed "up too little of the land, those worthy coun- "trymen turn the best inhabited places into "solitudes. By which means, those miserable "people, both men and women, married and "unmarried, old and young, with their poor "but numerous families, (since country busi- "ness requires many hands,) are all forced to "change their seats, not knowing whither to "go; and they must sell, almost for nothing, "their household stuff, which could not bring

" them much money even though they could " stay for a buyer; while they would willingly " work, but can find none that will hire them: " for there is no more occasion for country " labour, to which they have been bred, " when there is no more arable ground left; " one shepherd can look after a flock, which " will stock an extent of ground that would " require many hands, if it were to be ploughed " and reaped. This, likewise, in many places, " raises the price of corn." Sir Thomas More was so sincere a Roman Catholic, that he sacrificed his life in support of papal supremacy; and, therefore, what he says in derogation of their own institutions, is of the highest authority. The miserable state of the poor has been charged upon the Protestants, as a consequence of the dissolution of the great abbies and monasteries; and that has been very generally assumed as a fact, even to this time: but that great man shews us, that those very abbies and monasteries were a principal cause of it. And it appears by the statute 25th Henry VIII., that they were in the practice not only of converting their own arable lands into sheep pastures, but of hiring others for the same purpose; and that the great sheep-owners had flocks to the number of twenty-four thousand each. We have also, from a poet of that time, the fol-

lowing curious complaint of the fact then so notorious.

" Before that sheepe so much did rayne,
" Where is one plough, then was there twayne;
" Of corne and victual, right great plentye;
" And for one penny egges twentye;
" I trust to God, it will be redress'd,
" That men by sheepe be not suppress'd;
" Sheepe have eaten men many a yere,
" Now let men eat sheepe, and make good cheere;
" Those that have many sheepe in store,
" They may repent it more and more."—&c.

In a pamphlet entitled " The Supplication of " Beggars," compiled by Symon Fyshe, in the year 1524, the poverty and immorality which then prevailed, is attributed to the abbies and monasteries. And, in the year 1546, was published " A Supplication of the Poore Commons," which, in reference to the former pamphlet says, " Not many yeres tofore, your Highnes " poore subjects, the lame and impotente crea- " tures of this realme, presented your High- " nes with a piteful and lamentable complaynt, " imputing the head and chief cause of their " penurie and lack of releefe unto the great and " infinite numbers of valiant and sturdy beggars, " which had, by their subtyl and crafty de- " meaner in begging, gotten into their hands " more than the third part of the yearely reve-

" newse of your Highness realme; (*vid.*) Monks, " Fryers, Chanons, Heremites, and Nunnes."

In the year 1581 was published, "A com- " pendious Examination of Complaints, &c. " &c. by W. S. gentleman." This has been erroneously attributed to Shakespeare; but it was written by William Stafford (*see Dr. Farmer's Essay, p.* 71.); It is in many instances surprisingly applicable to the present time, and would do honour to any political writer. In this, also, there is " a complainte " againste sheepe."

I have thought it necessary to refer to so many authorities, to shew, that the great distresses of the poor in those times were not (as commonly supposed) from the dissolution of monasteries, but from the *want of employment.*

The laying together of farms, which was the first step towards those great flocks, had, some time before, been noticed by the legislature, in the statute of 4 Henry VII. c. 16, and other statutes.

The misery of the poor, country labourers, in consequence of these great monopolies, was, at that time, greater than that of any of our manufacturers at present: it does not appear that the inhabitants of the towns were much affected.

As a matter of somewhat more than curiosity, I will compare a passage in an author of the time

of Henry VIII., with one of our own time and country. The first bids his reader "lift up his "eyes, and see how great a multitude of poore "people runne thorowe everye towne."—*Coverdale's Pref. Translation of the Bible.* Our contemporary author says, "In consequence of "this decline, the populous parishes of Bisley, "Horsley, Stroud, and others, in these enchant- "ing vales, fell into decay, and almost wholly "into beggary. I cannot forget the colonies "of mendicants, which, thirty years ago, poured "from them into the adjacent towns on the "Cotswold Hills."—*Dr Parry on Fine Wool p.* 74.

In the 22d year of Henry VIII., it was found necessary to distinguish between aged and impotent beggars, and vagabonds; the former were to be licensed by the magistrates, and the latter punished, 22 Henry VIII. c. 12.

The very extraordinary increase of sheep, which is so vehemently complained of, was occasioned by a large exportation of them to other countries; in consequence of which, the surplus value of the produce of the land became greater by means of sheep than of tillage. This occasioned the statute of 25 Henry VIII., c. 13; which, by a mistake too common in legislation, was pointed at the effect, instead of the cause. The statute recites, "that divers persons, pos-

"sessed of a great personal property, had accu-
"mulated, as well farms as cattle, and especially
"sheep, putting such lands, as they could get,
"to pasture, and not to tillage; whereby a
"marvellous number and multitude of the
"people of this realm be not able to provide
"meat, drink, and clothes, necessary for them-
"selves, their wives, and children; but be so
"discouraged by poverty and misery, that they
"fall daily to theft, robbery, or pitifully die of
"hunger, cold, &c.; and that one of the great-
"est occasions of this is the great profit that
"cometh of sheep; some having twenty-four
"thousand, &c. &c.; it is, therefore, enacted,
"that no person shall have, of his own property,
"by any means, fraud, craft, or covin, above the
"number of two thousand sheep, at one time,
"within any part of the realm, upon pain, &c."

In the first year of Edward VI., an experiment was made to prevent idleness among the poor, which was disgraceful to the law, and abhorrent from the Constitution of the country; it was enacted, that all idle vagabonds, who could not get employment, should be made slaves to any who would take them. To the great honour of the kingdom, it was found that this degrading statute could not be enforced; and it was, therefore, repealed by the

4th and 5th Edward VII., c. 16, and the former statute of 22 Henry VIII., was revived.

The encouragement to exportation still continuing, and the statute of the 25th Henry VIII. being open to many evasions, it became quite ineffective; and the lamentable consequences still prevailing, the tremendous statute of the 8th Elizabeth, c. 13, was passed; whereby, without recital, it was enacted,

"That no manner of person or persons, "of what estate or condition soever he or they "be, shall, after the last day of February next "ensuing, bring, deliver, send, receive, or "take, or procure to be brought, delivered, "sent, or received, into any ship or bottom, "any rams, sheep, or lambs, or any manner of "other kind of sheep, being alive, to be carried "or conveyed out of this realm of England, "Wales, or Ireland, or out of any of the "Queen's Highness's dominions; upon the "pain, that every such person or persons, their "aiders, abettors, procurers, or comforters, "shall for his or their first offence or offences, "so done, contrary to the meaning of this sta-"tute, forfeit and lose all his goods for "ever; and further, shall suffer imprisonment "by the space of one whole year, and at the "year's end shall, in some open market-town, "in the fulness of the market-day, have his

" left hand cut off; and that to be nailed up in " the openest place of such market; and that " every person or persons eftsoons offending " against this statute shall be adjudged a " felon, and shall suffer death, as in cases of " felony."

Adverting to the description of persons who were, and still are, most likely to fall within the terrific penalties of this statute, it may be considered as one of the most determined acts of legislative power which is to be found in our statutes. And, unlike other penal statutes, the extreme severity of it did not prevent its execution; for being in favour of the poor against the rich, and a moiety of the pecuniary penalty being paid to the informer, the danger of the statute was too great to be incurred.

The legislature, having seen the effect of the statute of 8th Elizabeth, seems to have presumed that there was less excuse for idleness; and by the 14th Elizabeth, c. 5, enacted, that " a " vagabond above the age of 14 years, shall be " adjudged to be grievously whipped, and burned " through the gristle of the right ear with a hot " iron," &c.; and this continued until the 39th Elizabeth, when it expired.

Many causes had contributed to an increased population about this time; there had been neither foreign or civil wars, of any importance,

for near a century; there were no emigrations, no drains from foreign colonies and garrisons and the dissolution of religious houses may have co-operated. In addition to this, the government was firmly established, the queen extremely popular, and no rank or condition in the state (as appears from the statute) was above the control of the executive power. The effect of the press began to be very considerable; many things were freely written and published in favour of the people; some of which I have noticed.

Under these favourable circumstances, and after all the cruel and absurd experiments had failed, which had been made for the purpose, not of finding employment, but of punishing those who were starving for want of it, the legislature resolved to enforce a remedy founded in humanity; the principle of which was, that all persons who were capable of employment should be set to work for the purpose of earning, or at least *contributing* towards, their own maintenance.

The *policy* of this principle can no more be disputed, than its *humanity;* but its manifold perversions and abuses have inflicted punishment, from generation to generation, upon all the superior classes in this country, for their own misconduct, and the avarice and cruelty of those who first gave occasion for its application. Na-

tional virtues and vices are rewarded and punished in this world.

By the 18th Elizabeth, c. 3, it was enacted, that "*a stock to set the poor on work* shall be "provided in every city and town corporate; and "that houses of correction shall be assigned "in every county, &c." Here we have the *first*, although very inadequate, legislative provision for *setting the poor to work*; and it appears to have been very minutely acted upon in the city of London; as may be seen in a publication by Hugh Singleton, entitled, "Orders "appointed to be executed in the city of Lon-"don, for setting roges and idle persons to "worke, and for releefe of the poore."

As I believe the pamphlet is very scarce, and almost as applicable to our present purpose as to that for which it was intended 240 years ago, I shall make no apology for copying a few of the orders contained in it: they are thus introduced:

"For releefe of the poore, and for setting to "worke of vagaraunt people, there are to be set "up in Bridewell certain artes, occupations, "works, and labours."

"8. Those whom the cittie by law is charged "to provide for, and are *able to work*, shall be "received into Bridewell, and there kept with "thin diet, onely sufficing to sustaine them in "health, and shall be set to worke in such of the

" workes, labours, and occupations, as they " shall be found fittest for.

9. " If any such shall loyter, and wyll not do " such labor, as in reason they ought, and as is " doone by other of like capacitie and strength, " they shall be punished in Bridewell, as is used " by the discretion of the Governors.

29. " No pension, nor other releefe, to be " given to any which are idle, being able to " labor. And such as will labor, and have " not, nor can provide, to set themselves " to worke, making their mone to the church- " wardens, or collectors for the poore, may, " by a bill to be signed with the hands of " the sayd churchwardens or collectors, or any " two of them, and three other parishioners, " have work appoynted, or delivered them, at " Bridewell or elsewhere.

30. " None of the poore, or their children, be " suffered to begg or wander in the streetes, " but be exercised upon meete labor, toward the " getting of their living in honest sort.

31. " In every parish, all the poore houses " shall be, at convenient times, visited daily, " if it may be, by some one or more, to be ap- " poynted at the vestry, to see how they apply " theyr work; and the defaults to be certified " every Sunday to the churchwardens, and by

" them, to be noted in a book against the " next vestry.

33. " Such as be impotent, and releeved by " pensions, and can do *somewhat*, shall be oc- " cupied in so *much* as they can doo; and the " sicke shall be visited and releeved of the com- " mon boxe for the poore in their parrish, du- " ring onely their sicknes, and afterward shall " apply to theyr labor againe.

38. " To every art, science, or labor, in " Bridewell, be appointed two of the governors " of Bridewell, to oversee the same, who shall " have care to the doing thereof, as they may " answer that charge in credite and conscience.

" *Arts, occupations, labors, and works, to be set* " *up in Bridewell.*

" The worke in the milles.
" The worke in the lighter, and unlading of " sand.
" The carying of sand.
" Making of shooes.
" Thicking of cappes, by hand and foot.
" Knitting of hose.
" Spinning of linnen yarne.
" Spinning of candle weeke.
" Making of pack-threed.
" Drawing of wier.
" Making of pinnes.

"Making of woll cardes.
"Making of nayles.
"Making of gloves.
"Making of combes.
"Making of inkle and tape.
"Making of silke lace.
"Making of apparell for the house.
"Spinning of wollen yrene.
"Making of pointes.
"Making of knives.
"Making of tenise balles.
"Making of bayes.
"Making of feltes.
"Picking of woll for feltes.
"Or any other that may fall in practice."*

Thus the law continued, without any parochial funds and provisions, until, by the 39th Elizabeth, c. 3, the several parishes were compelled to set the poor to work, who were able, and could not procure employment; and to assist those who were old and impotent. This last object of the statute was not new; and it is not within the subject of my observation.

But it is most important to my present purpose to observe, that in this humane system, circumscribed as it is by moral and sound policy,

* All the scarce pamphlets which I have quoted, are now in my possession, by favour of our worthy friend, and your coadjutor, C. J. Harford, esq.

there is no other authority or pretence, for any other mode of relief or assistance for those who are able to work, than that of *providing them employment.* To that they were by this statute first entitled; but if that be abandoned they forfeit their claim to any other. If the overseers fail on their part, either altogether, or in any degree, then, and not until then, the pauper has a right to that portion of assistance, which will supply the default of the overseer. Those who are ultimately compelled to support the burden of maintenance of the pauper, and his family, are in law, and common justice, entitled to have it removed, or diminished, by all the labour which is directed to be called forth for that purpose; it is a previous condition, of which they have a right to the execution, through the hands of the overseers; and if they neglect this primary duty, and by encouraging idleness, and all its consequences, oppress their industrious neighbours, they are themselves liable to answer for their misconduct. It appears, that this most important national system, thus commenced, was fully and finally approved in the next parliament, which will ever be famous in legislature, for the statute of the 43d Elizabeth.

Notwithstanding the very great importance of this Act of Parliament, it sets out, without any recital, with "Be it enacted;" and it does not

appear, that there was any debate upon it, in either house. But it was resolved unanimously, that to set the poor to work, who could not otherwise procure employment, was the great object to be effected.

I presume, that I have now shewn, from the occasion and intention of the statutes, that the practice of supplying the poor with pecuniary or other relief, (if relief it can be called,) whilst they remain in idleness, is *contrary to law*.

I will proceed to shew, that it is inconsistent with the principles of justice and morality.

It is inconsistent with justice, both *political* and particular: political justice is that which is required in the administration of public affairs; particular justice is that which is required between man and man.

Nothing can be more easy than to shew, that it is subversive of all political justice to compel those who have property, and are the persons upon whom the state depends for its very existence, to expend it in supporting in *idleness* those who have none. It is setting loose the bands, and reversing the principles, upon which society is founded; it is exalting poverty above wealth, and what is still worse, idleness above industry.

I admit, as beyond all question, that under our humane government, in an opulent, manu-

facturing, and commercial country, every individual of his Majesty's subjects is to be supplied with means of life; but I contend, that none are to be supported without being *set to work*, who can maintain, or *contribute* to maintain, themselves. "Political economy, considered as a "branch of the science of a statesman or legis- "lator, proposes two distinct objects; first, to "provide a plentiful revenue, or subsistence, for "the people; or more properly, to *enable them* "to provide such a revenue or subsistence for "themselves: and secondly, to supply the state "or commonwealth with a revenue sufficient "for the public services."—*Adam Smith.*

These several objects can only be attained by strict political justice; but it is evident that Government (I do not allude to any one party) has for a long time pursued a system incompatible with the former object; for where is the political justice, of permitting one class of the people to be principally the occasion of a rate of eight millions a year, and another class principally to pay it? We all know that revenue and subsistence, in this country, is produced by the three classes of landowners, and landoccupiers, and those whose capital is employed in trade and manufactures. These three are like the three great powers of the legislature; if either is suffered to preponderate, the equilibrium

is lost. Now whatever doubts there may be as to a preponderating influence among these great powers, there can be no doubt that the influence of Government is thrown into the scale of trade and manufactures. The consequences of this partial system have often been deprecated, and are now severely felt.

I think it easy to demonstrate, if demonstration were wanted, in addition to the hard lesson of experience, which the nation is at this time compelled to learn, that its great permanent and ultimate dependence is upon that support which is derived from the land, (I do not mean this to the extent of the French economists;) so literally true it is, as we are told by the highest authority, that "the king (the state) "consisteth by the land that is tilled."—*Eccles.* v. 8. Neither the state, nor the owners and tillers of the land, are now able to provide for those who are charged, and depend, upon them; who, for their own security, ought willingly to assist in bearing the public burden.

The landowner, whose estate has been mortgaged by Government, pays all the direct taxes upon it, as though he were the only person interested in it, without any contribution from the mortgagee.

You will begin to consider, my dear Sir, what the magistracy of the country has to do with this

great political subject. It certainly has but little, but it has something, and has had much more.

In strict political justice every class of society ought to bear its own burdens. The trading and manufacturing class should support their own poor, and the landowners and occupiers theirs; and those who derive a revenue from money and interest should contribute to each; but out of this enormous revenue nothing is contributed in aid of either.

This exemption is destructive of the principle, and contrary to the express direction, of both the statutes of Elizabeth; by which it is enacted, that every inhabitant (and occupier) in every parish shall be taxed according to his means. Now although that opulent class, of which the creditors of Government are composed, did not exist when these statutes were made, it must be admitted, that they are within the letter and principle of the law. But from the first million which was borrowed by the 4th William and Mary, c. 3, to the present time, the uniform system of Government has been to exalt the monied above the landed interest; which, for various reasons, and under various consequences, has been so far persisted in, that the interest upon the debt is now more than equal to the rental of England. "Thus a new

" estate and property is sprung up in the hands " of mortgagees, to whom every house and foot " of land in England pays a rent-charge, free of " all taxes and defalcations, and purchased at " less than half value; so that the gentlemen of " estates are in effect but tenants to those new " landlords." This was the observation of Dean Swift, when the debt was only fifty millions.

I return to what falls directly within the province of the county and corporate magistrate.

The rating upon all kinds of property, although *tangible*, which is employed in trade and manufacture, if at all rated, is very greatly below its proportion to that of land. Look into the great manufacturing towns of Glocestershire and Somersetshire, and whilst the land in these townships pays to the amount of half the rent, or more, see what is charged upon the wealthy master manufacturers.

I remember, when a question as to the disproportionate rating of stock in trade was argued in the Court of King's-Bench, many years ago, Mr. Bearcroft admitted that his clients were rateable in their proportion; but avowed, in plain terms, that it was impossible so to rate them. This is one instance among many in which the magistrate may interpose, to diminish the great predominance of interest against the landholder. And as the great manufacturer is generally a

stockholder, the inequality of the rate is further increased and aggravated. It must be admitted that political justice has been greatly infringed.

Let us consider how the maintenance of the poor stands as to particular or private justice, in which is included the moral consideration.

The manufacturer has many personal advantages over the labourer in husbandry. He has frequent opportunities, in cases of extraordinary demands for his exertions, of making considerable provision for worse times. Husbandry labour has never any very great or long advance. When unusual exertions are wanted, or the manufacturer is disposed to make them, he is not limited to day light. The wear and tear of his clothing is generally less; and also his necessary portion of food, from a less exhaustion of his physical powers. He has more frequent opportunities of drawing assistance from his children at an early age.

The country labourer can never interfere in the business of the artificer; who, when his occupation is gone, may always employ his mere bodily strength in diminution of the employment of those who can only dig for their bread.

The work of the labourer in husbandry is frequently discontinued, from the diminution of the means and capital of *his* employer, occasioned

by *his* contribution to the support of the manufacturer.

In all these particulars, and many others, an advantage is obtained over the spade and the plough by the hammer and the shuttle; but when those who handle the former work hard at insufficient wages, those of the latter are too often suffered to live in idleness upon the property of others, because they will not apply their physical strength to general purposes. This is personal injustice to every individual upon whom the consequential burden falls. Injustice through all social life, and from whatsoever source, is its own avenger; that of nations (as in this instance) increases their liabilities, and reduces their means: in inferior societies, it sometimes draws them within the cognizance of the law, and always diminishes their influence, and brings them into contempt; and in individuals, its punishment begins only in this world.

I beg to apologize for what may be unnecessary of this inducement, and proceed.

It is observable, that, in both these statutes of Elizabeth, the first requisition as to the relief of the poor, is for the employment of their children; and we must necessarily infer from this, that the intention of the legislature was, that no inexperience, and nothing short of total

imbecility, should exempt a pauper from being set to work; it was his title to relief; or more strictly, it was the medium through which he was to receive relief.

The purpose of the former statutes was to prevent the various ill consequences of idleness among the poor by general punishment, without any discrimination of that which was occasioned by the absolute want of employment. The humane intention of those of Elizabeth was to inculpate all idleness, by taking away the former excuse for it. If children are not to be exempted, much less are women and manufacturers; although the employment provided be not within their usual habits.

The great defect in our system for the relief of the poor is not in the principle or provisions of the laws, but in their execution. If this were as complete as it might (but never will) be, I am persuaded that two-thirds of the burden, which now leans so heavily upon the public, and embarrasses the Government, would be removed. A complete execution of the poor laws can only be effected by the adequate attention of those who are concerned in interest, and the strict administration of those who are bound in duty. If the churchwardens and overseers did the duty they owe to their own families, to their neighbours, and to the public, no pauper, man,

woman, or child, possessed of any applicable strength, would be relieved without its due application; for the magistrate would refuse relief to those who refused to work.

To those who are incapable, altogether or in part, to earn a sufficient maintenance, God forbid that the misapplication of the present enormous funds for that purpose, or any other calamity which may befal this country, should ever so far reduce it, as to disable it from administering relief. An idle pauper is injurious to the public, at the least by the loss of his labour; an idle overseer, who abandons the office which his very name imports, turns a mere paymaster, and distributes premiums to idleness, is the person to whom the public is to impute the perversion of the poor laws, and the greater part of the burden of eight millions a year expenditure in a manner often worse than useless.

The excuse of the pauper and the parish officer is the same, and in most cases equally groundless; both say, "there is no work to "be gotten."

To shew that this is always in a great measure unfounded, and often altogether so, would require a minute, and in many cases a local, investigation, as to the various modes of employment; but it may be generally and confidently asserted, that there is no part of England in

which manual labour may not be made of some value.

Whilst there are roads in the several parishes ill formed, or out of repair, and materials to be prepared for future use; sewers to be cleansed, or any other parochial work to be done; (and in what parish is not such work to be found?) there is not only no excuse for idleness, but a requisition for labour. Materials for the coarse kind of manufactures may be prepared with some profit, in most parts of the kingdom; such (in the words of the statute) as "flax, hemp, "wool, thread, iron, and other necessary ware "and stuff, to set the poor on work."

If there be really no work to be done *for the parish*, it may be sometimes had in an adjoining or neighbouring one; in which case, if there be a proper understanding between the surveyors and overseers of each, there will be no difficulty. In aid of these operations, the magistrates in their sessions should set forward all public works chargeable upon the county; and should give a preference in employment to those parishes which are most burdened. It should, by no means, be permitted to a manufacturer who cannot, as he has been accustomed, get 40s. or 20s. a week, in his own craft, to refuse whatever may be gotten in that or any other employment.

I need not state to you, sir, nor to your very able coadjutors, what powers the magistrate has for the promotion of this general system of industry.

Surveyors may be compelled to do their duty in aid of overseers; and no relief should, on any account, be given to a pauper who is able, and has refused, to work.* Regular and attentive vestry meetings should be held for the purpose of aiding and controling the parish officers; and it is to be regretted, that in this respect, and in some others, the legislature has given so little authority to the magistrate.

It may possibly be said, that this is not a time to use coercive measures, either as to parishes or paupers; but by what other means are the poor to be relieved? Where both law and justice require exertion, delay is unjust and illegal.

* The following is an instance of the beneficial consequences of the joint efforts of overseers and surveyors in setting the poor to work:—The very intelligent Superintendant of all the Bristol roads lately proposed to the Governor of the General Hospital of the Poor of the city, to set to work as many as were capable of employment. Thirty-nine men were immediately put under his direction; and work, suited to the strength of each, was allotted to them, at the same rate of payment with the usual labourers: after two days, *only five* of the thirty-nine remained at their posts. Some few, after finding that they would not be further noticed at the hospital, returned, and begged to be taken again. Many others have since been sent to the same employment, with nearly the same result. This may be offered as a lesson and example, pregnant with many observations, to every Surveyor and Overseer in the kingdom.

A decisive experiment may perhaps be made in some heavily burdened parish, in which the magistrates may exert a benignant personal interest, to put the whole law strictly and prudently in force, for the purpose of substituting industry for idleness. "By an attention of this "kind, in the magistrates of Chester, the poor-"rates have, within these few years, been reduced "from eighteen hundred to three hundred per "annum; and the same good consequences "might be reasonably expected elsewhere, from "the same care in the management of the poor."

These are the words of Mr. Daines Barrington, written fifty years ago; by the returns in 1803, I find that the poor-rate for Chester amounted to £2761.

I presume, but with great submission to your experience and practical knowledge, that I have shewn, as I proposed, that the present too general error in relieving the poor in a state of idleness is contrary to law, and inconsistent with the principles of justice.

I beg to apologize for such observations as do not *immediately* bear upon this most interesting subject, and especially as many other topics relating to it, which will occur to you, have not been touched. I cannot conclude without expressing an earnest wish to make some acknowledgment for the very kind attention, which, for upwards

of twenty years, I have received from the magistrates of the Barton Regis district in Gloucestershire; and I am sure that I can propose nothing in so acceptable a shape as that which I now offer, in case you should think that it has any tendency, through your and their hands, to diminish the burden under which the country is at this time suffering.

I am, dear Sir, with great repect,
Your obedient and faithful servant,

EDMUND GRIFFITH.

Bristol, Nov. 6, 1816.

To Thos. Græme, esq; Oldbury Court.

ARTICLE XVI.

A List of the Premiums and Bounties adjudged by the Society, at the Annual Meetings since the Publication of the 13th Volume, viz.

At the Annual Meeting in 1814.

	£.	s.	d.
TO Sir J. C. Hippisley, bart. for an Experiment on Fiorin Grass	21	0	0

To John Benett, esq; for the best Treatise on the Commutation of Tithes, the BEDFORDEAN GOLD MEDAL.

To Dr. Cogan, a SILVER BEDFORDEAN MEDAL, as a testimony of the high respect of the Society for past services.

To Mr. King, statuary, of Walcot-House, for a Plaster Bust of the late Vice-President, Mr. Billingsley, presented by him, a SILVER BEDFORDEAN MEDAL.

	£.	s.	d.
To Rev. Robt. Hoblyn, for a Treatise on the Diseases in Wheat, a piece of Plate, value - - -	15	15	0
To John Benett, esq; for 1st premium at the Ploughing Match, 1814, -	5	5	0
To Philip Whitaker, esq; 2d ditto -	3	3	0
To George Rogers, manager of 1st Plough, a Coat and buttons, and -	1	1	0
To John Newman, 2d ditto, a Coat and buttons.			
To six other Ploughmen - -	1	10	0
To George Ford, 1st premium for Shearing, a Coat and buttons, and	1	1	0
To Abraham Ford, 2d ditto, a Coat and buttons.			
To Thomas Tyley, 3d ditto, a Jacket and buttons.			
To two other Shearers - -	0	15	0
To Jas. Tyley, for bringing 30 sheep for the Experiment - - - -	2	2	0
To John Benett, esq; for raising a crop of Turnips for spring feeding	10	10	0
To C. Gordon Gray, esq; for the best sample of neat Cattle for breeding	10	10	0
To Robert Hughes, esq; for the best fat Ox - - - - - -	8	8	0
To ditto, for a spay'd Heifer -	8	8	0

	£.	s.	d.
To his Grace the Duke of Beaufort, for second best fat Ox - -	4	4	0
To John Benett, esq; for a fat Ox, a bounty of - - - - - -	3	3	0
To ditto, for a fat Cow - - -	5	5	0
To ditto, for the best fat Heifer -	8	8	0
To Charles Gordon Gray, esq; for the best fat Steer - - - -	10	10	0
To Mr. Richard Brooke, for a fat Cow	5	0	0
To H. Biggs, esq; for a pen of South-Down Ewes - - - -	10	10	0
To Mr. Isaac Kendall, for 2d best ditto	3	3	0
To Wm. Tinker, esq; for exhibiting a pen of Merino Ewes - -	6	6	0
To ditto, for exhibiting a Merino Ram, and three Wethers - -	3	3	0
To ditto, for exhibiting the finest fleece from a British Ram - - -	5	5	0
To Wm. Tinker, esq; for exhibiting the finest fleece from a British Ewe	3	3	0
To Mr. D. Hayward, for exhibiting the best fat Wether Sheep -	6	6	0
To John Wiltshire, esq; second best ditto - - - - - -	3	3	0
To John Cann, esq; for exhibiting the best fat Ewe - - - -	4	4	0
To an unknown exhibitor of a Devon Ox - - - - - - -	5	5	0

	£.	s.	d.
To Mr. C. Garrett, for exhibiting six fine-woolled Rams - - -	10	0	0
To the Old-Cleeve Female Friendly Society - - - - - -	10	10	0
To Robt. Pinckney, for 45 years faithful servitude - - - - -	3	3	0
To ditto, as labourer in husbandry	3	3	0
To John Parsons, for 56 years faithful servitude - - - - -	3	3	0
To Hugh Carson, the Inventor of a Wind-Mill - - - - -	5	0	0
To unknown exhibitor of a Piece of Mechanism - - - - -	5	5	0
To Mary Long, for reaping Wheat	2	2	0
	£218	2	0

At the Annual Meeting in 1815.

To Rev. W. B. Barter, for the cultivation of Fiorin Grass - -	10	10	0
To Wm. Dyke, esq; for folding the greatest number and most profitable sort of Sheep, a premium of -	10	10	0

	£.	s.	d.
To Rev. Sir Charles Rich, bart. for breeding and keeping the greatest number of the most profitable sort Sheep, a premium of - -	10	10	0
To Wm. Tinker, esq; for raising a crop of Swedish Turnips, a bounty of	6	6	0
To Rev. J. Cockin, for the discovery of a new Manure, a premium of	5	5	0
To Mr. John Eason, for exhibiting the best Bull and Cow, and offspring, the President's premium - -	21	0	0
To Mr. John Walker, for a similar exhibition, a bounty of - -	5	5	0
To Mr. George Garlick, for the best fat Ox, a premium of - -	8	8	0
To Mr. Jas. Smith, for a fat Ox, a bounty of - - - -	5	0	0
To ditto, for the best Cow, a premium of	4	4	0
To Mr. John Walker, for the best fat Heifer, a premium of - -	10	10	0
To Mr. Robt. Hughes, for a fat Cow, a bounty of - - - -	3	3	0
To Mr. John Eason, for exhibiting 3 Heifers for breeding, a bounty of	5	5	0
To C. Codrington, esq; for the best fat Wether Sheep, a premium of -	6	6	0
To *** Stephens, for a remarkably fat Ewe, a bounty of - - -	3	3	0

	£.	s.	d.
To Abraham Ford, 1st premium for Shearing (with a Coat and buttons)	1	1	0
To Thomas Tyley, 2d ditto, a Coat and buttons.			
To Saml. Scrivens, 3d ditto, a Jacket and buttons.			
To James Weeks, for Shearing, a gratuity of - - - - - -	0	7	6
To James Tyley, for bringing 20 sheep for the above Experiment	2	2	0
To *** Tyley, (a lad,) for dexterity in Winding the Fleeces at ditto, a gratuity of - - - - -	0	5	0
To Ann Smith, for reaping 7 acres of Wheat, a premium of - -	2	2	0
To Richard Shadwell, for 40 years faithful Servitude, a premium of	3	3	0
To George Frend, a labourer in husbandry, a premium of - -	3	3	0
To Mr. Pope, of Bristol, for exhibiting his mechanical contrivances, as applicable to Wheel Carriages, a bounty of - - - - -	5	0	0
	£132	8	6

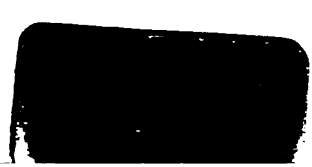
RECAPITULATION.

		£.	s.	d.
Amount of Premiums and Bounties given at the respective Annual Meetings from 1777 to 1813, both inclusive - - - - -	3857	18	6	
Amount of Premiums and Bounties given at the Annual Meeting	1814	218	2	0
Ditto - - - - -	1815	132	8	6
		£4208	9	0

Exclusive of five Gold Bedfordean Medals, and seven Silver ditto.

FINIS.

Printed by Richard Cruttwell,
St. James's-Street, Bath.



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